

bart impact program

THE IMPACT OF BART ON THE COMPETITIVE ADVANTAGE AND EFFICIENCY OF BAY AREA BUSINESS OPERATIONS

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technical memorandum

The BART Impact Program is a comprehensive, policy-oriented study and evaluation of the impacts of the San Francisco Bay Area's new rapid transit system (BART).

The program is being conducted by the Metropolitan Transportation Commission, a nine-county regional agency established by state law in 1970.

The program is financed by the U.S. Department of Transportation, the U.S. Department of Housing and Urban Development, and the California Department of Transportation. Management of the Federally funded portion of the program is vested in the U.S. Department of Transportation.

The BART Impact Program covers the entire range of potential rapid transit impacts, including impacts on traffic flow, travel behavior, land use and urban development, the environment, the regional economy, social institutions and life styles, and public policy. The incidence of these impacts on population groups, local areas, and economic sectors will be measured and analyzed. The benefits of BART, and their distribution, will be weighed against the negative impacts and costs of the system in an objective evaluation of the contribution that the rapid transit investment makes toward meeting the needs and objectives of this metropolitan area and all of its people.

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THE IMPACT OF BART ON THE COMPETITIVE ADVANTAGE
AND EFFICIENCY OF BAY AREA BUSINESS OPERATIONS



August 1977

TECHNICAL MEMORANDUM

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PREPARED FOR

U.S. DEPARTMENT OF TRANSPORTATION

AND

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

WASHINGTON, D.C.



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16. Abstract This technical memorandum evaluates the economic effects of BART's transportation service on the competitive advantage and efficiency of Bay Area business operations. The scope of the analysis includes potential economic impacts resulting from improved transportation service and accessibility for workers to jobs, impacts of regional competitive advantage due to locational advantage or regional "image," and possible economic efficiencies associated with BART service. The study methodology, which is also documented, includes a shift/share analysis of Bay Area employment since 1962, extensive interviews with industrial and commercial decisionmakers, and four case studies.			
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BART: The Bay Area Rapid Transit System

- Length:** The 71-mile system includes 20 miles of subway, 24 miles on elevated structures and 27 miles at ground level. The subway sections are in San Francisco, Berkeley, downtown Oakland, the Berkeley Hills Tunnel and the Transbay Tube.
- Stations:** The 34 stations include 13 elevated, 14 subway and 7 at ground level. They are spaced at an average distance of 2.1 miles: stations in the downtowns are less than ½-mile apart while those in suburban areas are 2 to 4 miles apart. Parking lots at 23 stations have a total of 19,000 spaces. There is a fee (25 cents) at only one of the parking lots. BART and local agencies provide bus service to all stations.
- Trains:** Trains are from 4 to 10 cars long. Each car is 70 feet long and has 72 seats. Top speed is 80 mph with an average speed of 38 mph including station stops. All trains stop at all stations on the route.
- Automation:** Trains are automatically controlled by the central computer at BART headquarters. A train operator on-board each train can over-ride automatic controls in an emergency.
- Magnetically encoded tickets with values up to \$20 are issued by vending machines. Automated fare gates at each station compute the appropriate fare and deduct it from the ticket value. At least one agent is present at each station to assist patrons.
- Fares:** Fares range from 25 cents to \$1.45, depending upon trip length. Discount fares are available for the physically handicapped, children 12 and under and persons 65 and over.
- Service:** BART serves the counties of Alameda, Contra Costa and San Francisco, which have a combined population of 2.4 million. The system was opened in five stages, from September, 1972, to September, 1974. The last section to open was the Transbay Tube linking Oakland and the East Bay with San Francisco and the West Bay.
- Routes are identified by the terminal stations: Daly City in the West Bay, Richmond, Concord and Fremont in the East Bay. Trains operate every 12 minutes during the daytime on three routes: Concord — Daly City, Fremont — Daly City, Richmond — Fremont. This results in 6-minute train frequencies in San Francisco, downtown Oakland and the Fremont line where routes converge. In the evening, trains are dispatched every 20 minutes on only the Richmond — Fremont and Concord — Daly City routes. Service is provided weekdays only, between 6 A.M. and midnight. Future service will include a Richmond — Daly City route and weekend service. Trains will operate every 6 minutes on all routes during the peak periods of travel.
- Patronage:** Approximately 130,000 one-way trips are made each day. 200,000 trips are anticipated under full service conditions.
- Cost:** BART construction and equipment cost \$1.6 billion, financed primarily from local funds: \$942 million from bonds being repaid by the property and sales taxes in the three counties, \$176 million from toll revenues of transbay bridges, \$315 million from federal grants, and \$186 million from interest earnings and other sources.

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SUMMARY AND FINDINGS

The Economics and Finance Project of the BART Impact Program was designed to contribute to the understanding of what impacts the construction and operation of rapid transit in the Bay Area have had on the region's economy and public financing. This technical memorandum focuses on the impacts which BART's transportation service, or BART's existence as part of the public infrastructure, has had on the efficiency of business and commerce within the region and the region's competitive advantage in attracting a greater share of the nation's growth.

The findings of this study have a bearing on the validity of economic development as a justification for transit investments. If rapid transit does not provide easier access to productive resources or improve the efficiency of doing business in the region, it may not influence rational business location decisions. If it does not influence these decisions, transit service cannot be considered a sufficient condition for improving the economic strength of a region.

The Impact of BART's Transportation Service on Accessibility to a Larger Work Force

Improved accessibility could represent a potential locational advantage for business and commerce, since it would increase the size of the labor force within commuting distance of an employer's location. Improved access to this essential productive resource would represent an economic impact of BART service.

Although BART transportation service reduces average access time to employment centers within the region, the improvement in accessibility is not sufficient to significantly change perceived or actual employment opportunity or size of the available work force.

The average access time for all zones in the three-county region to zones of high employment potential in the Bay Area is reduced by BART's contribution to the region's transportation system. The average reduction is estimated to be 19 percent, or eight minutes' difference between the average travel time of 43 minutes for the transit journey to work without BART and 35 minutes with BART. Higher-income households are estimated to experience an even greater travel time saving with BART, 22 percent. Households below poverty level and nonwhite households save only 10 percent in their average journey to work to one of the zones of high employment

potential. Although these time savings are an indication of improved accessibility, the research indicated that this had no effect on business productivity or the competitive advantage of the region in attracting business or industry.

The Impact of BART's Transportation Service on Accessibility to Employment

The other side of the issue of an employer's access to a larger work force is the access to employment for the region's residents. If BART service were to provide greater access to employment opportunities for actual or potential members of the work force, including the underemployed and ethnic minorities, it would represent an economic impact, since it would increase the utilization of the labor resources of the region.

The unemployed, however, experience an estimated reduction in their average access time to the 100 top employment zones within the region of 14 percent, reflecting only a five-minute saving between the 32-minute journey with BART and the 37-minute journey without BART. This distinction is not sufficiently substantial to suggest an increase in employment opportunity, perceived or real, as a result of BART's service.

The Impact of BART's Transportation Service on Business Efficiency

If substantial use of BART were made by employees in the course of business, it might be possible to identify an efficiency advantage from BART's transportation service. But less than 3.3 percent of the responses to the BART Passenger Profile Survey in 1976 indicated business-related use of BART during the peak period, and only 6.6 percent in the off-peak.

While there were indications in the interviewing program that business use that does occur on BART would not be replaced by use of alternative transit modes without BART, neither the ridership statistics nor the research program indicates an impact which significantly affects the efficiency of business operations in the Bay Area.

The Impact of Transit Service on the Region's Competitive Advantage in Attracting Business

Can rapid transit, through improving working conditions, economic efficiency, the availability of workers and the employment opportunity of the population, increase the productive use of regional resources to the extent that the region has a competitive advantage in attracting future national growth? Will the region attract more than its share of new economic

growth? Will the effect of transit on productivity of the region's resources, and even its effect on the region's image, cause corporations to locate (or expand) in this region, rather than another?

Statistical analysis of Bay Area employment since 1965 identified five types of economic activity in the region which grew at a rate which could not be explained by national growth patterns or industry growth patterns. These activities were government, central-office activities, services, finance and manufacturing. An extensive interviewing program was conducted to identify BART's potential impact on these growth patterns and determine whether BART was responsible for the answer to any of the previous questions.

The interviewing program supported three conclusions.

- There was no locational advantage for the BART service area compared to other areas in the Bay region, or other regions, because of the existence of BART. There are no instances in which BART service could be cited as a significant cause or reason for a location decision from outside the Bay Area.
- There are no instances cited in which BART provided a significant efficiency of operation for an existing business. BART usage is a convenience in many instances, but no case was identified in which the availability of BART's service would have a measurable effect on productivity or operating profit.
- There was no indication that BART in any way affected demand for the products of the Bay Area's export-base industry -- including the tourism industry.

Case Study: Central Office Activity

A case study was developed on the Clorox Company, which has its headquarters office in the Oakland City Center, a location with excellent access to the BART system. If any efficiencies of operation for headquarters functions anywhere in the Bay Area were to be attributed to BART, it was hypothesized it would exist in this case. Access to BART, however, was not key to the location decision of the company, although use of BART for business purposes was considered a convenience.

Case Study: Health Care Delivery

A case study was prepared on the Kaiser Foundation medical services as an economic sector. While the Kaiser center in

Richmond was located on a site served by BART, there was no indication that BART had an impact on the economic efficiency of providing medical service. BART was considered a convenience and was used in the course of Kaiser's business operations. A limited number of Kaiser patients utilized BART to take advantage of Kaiser's services, but, in fact, there was every indication that the same group would use public transit in the absence of BART. No other significant impact emerged from the case study.

Case Study: Finance

The branch banking operation of California Savings and Loan Company was selected to evaluate BART's potential utility as a facilitator of a technological innovation that would not have been possible with the No-BART Alternative. This innovation is a remote teller contained within the Powell Street BART station, which permitted BART patrons to transact business from the station. Although market potential for the remote teller had been carefully researched, the results were disappointing. Moreover, although four of the institution's five branches are located in or near BART stations, BART was not considered a significant influence on the location decision, nor did it contribute to the efficiency of bank operations through expediting communications or interbank transfers.

Case Study: Government and Public Services

A case study was developed from interviews with three public agencies, the U. S. Energy Research and Development Administration (ERDA), the U. S. Social Security Administration (SSA), and a field office of the Federal Bureau of Investigation (FBI).

ERDA's regional headquarters is located in San Francisco and an administrative center is located in the Oakland City Center Project. Although BART and its transportation service influenced the decision to locate in Oakland, this decision has had no consequential impact on efficiency of ERDA's operations or the ability to recruit employees. Nor was the location near BART deemed an advantage in the journey to work.

The SSA is located in Richmond and was responsible for a special Daly City-Richmond train twice a day designed to provide direct access to the Social Security Center by the employees who lived in San Francisco and were transit-dependent. The case study indicated that BART's reliability problems actually discourage its use and that BART service became a convenient explanation for tardiness.

The FBI field office in Berkeley provided the only example of identified efficiency from BART transportation service. Two of the six agents are regular BART commuters, and the agency was able to eliminate one of its six staff cars because agents could use BART in carrying out their daily responsibilities.

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I. INTRODUCTION

As the first regional rapid transit system built in the U. S. in more than 50 years, the San Francisco Bay Area Rapid Transit System (BART) is a potential learning model for metropolitan areas now considering investments in transportation facilities. It is of additional interest to the federal government in allocating financial aid for local transportation improvements, urban development and environmental protection in urban areas. The BART Impact Program is designed to meet immediate needs for accurate information on the BART investment and to provide input for future transportation decisions in the Bay Area and throughout the nation.

The BART Impact Program is a comprehensive, policy-oriented evaluation of the BART System. It covers the entire range of possible rapid transit impacts and includes major impact studies of the Bay Area's transportation systems, travel behavior, land use and urban development, the environment, the regional economy, social institutions and life styles, and public policy. The impacts are defined, then measured and analyzed by their effects on population groups, local areas and economic sectors. Finally, the benefits of BART are weighed against the negative impacts and system costs to arrive at an objective evaluation of the BART investment in meeting the overall needs and objectives of the metropolitan Bay Area and its people.

The Economics and Finance Project of the BART Impact Program was designed to contribute to the understanding of what impacts the construction and operation of rapid transit in the Bay Area have had on the region's economy and public finance. This technical memorandum focuses on the impacts which BART transportation service or its existence as part of the public infrastructure has had on the efficiency and the competitive advantage of business and commerce within the region.

Is it more efficient to conduct business in the Bay Area with BART? Does BART give the Bay Area a competitive advantage over other regions as a location for business and commerce? Is there validity in the argument that improved transit service will assist a region in gaining a larger share of the nation's growth?

These questions directed the research approach of this aspect of the Economics and Finance Project. This memorandum documents an evaluation of the potential impacts of BART service on providing business, commerce and industry with accessibility to a larger work force. It also describes the methodology used to

gain quantitative evidence of regional growth which might have been stimulated by BART and its service and reports the findings.

Finally, it contains the findings of an extensive interview program designed to confirm or refute BART's impact on the efficiency, productivity and competitive advantage of business in the Bay Area, seeking a causal link between BART and any measurable changes in regional growth. The findings include four case studies, focusing on potential impacts on central office activities, health care delivery, financial institutions and public agencies.

II. THE RESEARCH APPROACH

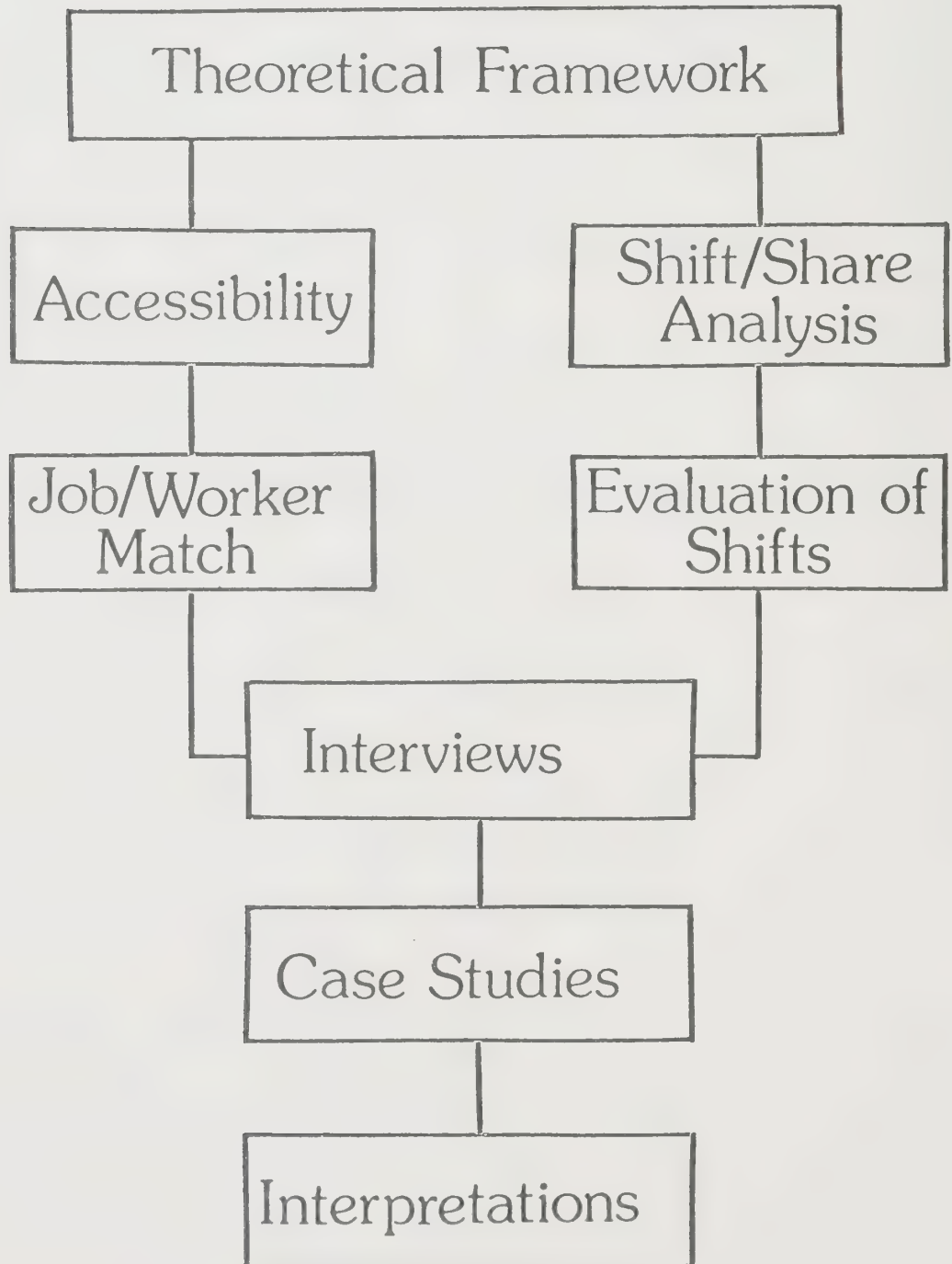
The objective of this aspect of the Economics and Finance Project was to detect changes in the economic activity of the Bay Area which were caused by BART's potential improvement to business efficiencies within the region, hence improvements to the competitive advantage of the region in attracting business. It also includes changes in the image of the region which would attract new business activity. If BART service provided better access to a trained work force, that too would represent a BART impact on the economic characteristics of the region.

The research approach deals with the elusiveness of identifying business efficiencies or competitive advantages, and their causes, through a three-step process, illustrated in Figure II-1.

- First, the estimated travel time differences between the BART and No-BART scenarios were analyzed to determine differences in accessibility between residential zones with high levels of unemployment and zones with potential employment. These data were provided by travel models and were evaluated in terms of the average impacts on socio-economic groups' access to employment zones.
- Second, and concurrently, employment data on the economic sectors of the region were analyzed through a shift/share technique to identify which economic sectors experienced unusual growth, since BART has been a potential influence on corporate behavior. If an industry in the region had grown at a rate which could not be explained by national economic growth, regional economic growth or the dynamics of that particular industry, it might have been because BART had provided that industry with a real or perceived competitive advantage in the region, which had influenced its growth. Shift/share analysis would identify the industries with unusual growth since BART was approved by the voters in 1962.
- Third, an extensive interview program was conducted to identify whether any changes in accessibility had effected business efficiency or regional competitive advantage as a location for business or production. The interview program also focused on the growth industries to determine whether BART services influenced their growth (or location decision) through efficiency improvements, productivity improvements, improved accessibility to the work force or even a change in the Bay Area image. From the interview material, four case studies were written.

Figure II-1

Research Strategy



The research hypotheses which represented the objectives of this study and the research findings are summarized in Table II-2. This section describes in greater detail the substance of each step of the research process and the selected methodology. It concludes with a description of alternative methodologies which were considered and dismissed.

A. BART's Impact on Access to a Larger Work Force

The analysis of employment accessibility for the work force addresses the possibility that the Bay Area, with BART, represented a region in which business was assured of better access to a trained work force or was able to recruit employees because of the promise of faster, cheaper or more convenient work trips. The analysis considered whether various groups -- particularly ethnic minorities or low-income workers -- could have access to employment that would be more expensive or even impossible under the alternative to BART (the No-BART Alternative or NBA) and whether business use with BART, apart from the journey to work, would be more efficient or economical than automobile or other transit trips in the NBA scenario.

The time and cost of travel between residential locations in the Bay Area and major employment centers was evaluated for BART and the alternative to BART by means of travel model results (the MTC Travel System Models and the Transportation Service and Travel Behavior Project). If accessibility to employment centers was substantially enhanced by BART, it would represent a possible impact on the competitive advantage of the region. Similarly, surveys of BART passengers could identify business use of BART which might not occur without BART. If there were an apparent difference between transportation service for the journey to work with BART and without BART, accessibility would become a focus of the subsequent interview program.

B. Potential BART Impacts on Business and Commerce within the Region

In addition to the impact improved accessibility to a work force might have on the attractiveness of a region for business or commerce, improved transportation service might also change the operating efficiencies of certain industries. If BART service, or the anticipation of BART service, had an effect on the Bay Area's economic growth, it might be apparent from economic growth which could not be explained by non-BART-related events.

Researching these potential impacts involved evaluating the actual performance of the Bay Area economy in what, at first

Table II-2

RESEARCH HYPOTHESES REGARDING IMPACTS
ON EMPLOYMENT AND COMMERCE

Impact	Original Research Hypothesis	Research Finding
Transportation Service and Accessibility	BART and NBA are equivalent in terms of access to employment for both nonminority and minority members of the labor force.	BART service provides marginally improved accessibility to employment over the NBA, although employment accessibility from BART is slightly greater for nonminorities.
	BART provides no cost advantage for interregional goods movements.	The definition of the NBA precluded any impact on freight transportation network.
	BART's service <u>per se</u> contributes to efficiency in the finance/insurance, services and public administration sectors and to headquarters functions in other sectors.	Business use of BART is insufficient to affect business efficiency in these sectors.
Competitive Advantage	Analysis of data suggests a locational advantage in the finance/insurance sector due to BART.	No evidence supports a locational advantage for firms in these sectors due to the transportation advantages associated with BART.
	BART is a significant, though subjective, consideration in locational decisions.	BART represents one element in the Bay Area image, but is not an instrumental determinant in business location decisions.
	BART is a significant consideration in recruiting technical and management personnel to the Bay Area.	While BART contributes to the image of the Bay Area, it is not a significant recruitment consideration.
	BART contributes to total demand and, thus, Bay Area growth through the tourist-related and finance/insurance sectors.	No BART-induced activity was discovered in the tourist-related or finance/insurance sectors.

Table II-2 (Continued)

Impact	Original Research Hypothesis	Research Finding
Economic Efficiency	BART-induced density increases and agglomeration produces a net increase in efficiency in the finance/insurance, business services and legal services sectors.	No operating efficiencies independent of efficiencies associated with agglomeration were identified. Agglomeration effects are within the scope of the Land Use and Urban Development Project.
	Residential location impacts had no measurable impact on business efficiency.	The minimal impact on accessibility results in no measurable residential business location interaction which impacts efficiency.

Source: McDonald & Grefe, Inc.

impression, would appear to be a combination of a "before and after" and a "control group" research procedure. While both procedures have been criticized increasingly, features of this strategy sought to avoid the shortcomings of each.¹

The methodology used to relate the growth in individual economic sectors in the Bay Area with the growth which could be expected because of national trends, or the growth of specific industry sectors in similar cities elsewhere, was shift/share analysis. Described in detail in Appendix A, this methodology was used to analyze employment data and to identify what Bay Area industries experienced increases in employment greater than what can be explained by trends in other control areas since BART was proposed. If employment in one sector increased, that industry group or sector may have experienced a BART-induced competitive advantage. Employment for the period 1965 through 1973 was evaluated on the assumption that BART did not represent a sufficiently certain addition to the regional infrastructure until mid-1963.² If industry were to move into the region based on anticipation of BART's service, it probably would not have occurred until at least 1965. The majority of BART's construction was completed by 1973, and business relocations to the region which were BART-induced would have probably occurred by then. After 1973, adverse publicity may have neutralized the expectations of BART's benefits. Further, the most recent data available were for 1973.³

If an industry or industry group experienced exceptional employment growth during this period, it was hypothesized it might have been due to BART. The interview program was designed to focus on those industries, to explore any potential effect of BART on these growth patterns. Since the shift/share analysis of employment would not reveal industries whose decline was slowed by BART's impact on operating efficiencies, the interviewing program was also designed, through a series of key-informant interviews, to discover other potential BART

¹Charles River Associates, Inc., "Measurement of the Effects of Transportation Changes," prepared for the Urban Mass Transportation Administration, Washington, D. C., August 1972.

²A taxpayers' suit, filed immediately following the bond issue approval in November, 1962, sought to invalidate the election and the District's contracting authority. The suit was settled in the District's favor in mid-1963.

³County Business Pattern data for 1974 and 1975 were released by the Bureau of Economic Analysis concurrently, subsequent to completion of the shift/share analysis.

impacts on the region's ability and success in attracting business and commerce.

C. Interviewing Program and Case Studies

The straightforward simplicity of the shift/share model does not negate its usefulness in analyzing a large amount of employment data to detect shifts in competitive advantage. The data contribute to a strategy of learning first what hypotheses can be supported by available data before beginning a more focused program of interviews and case studies. The shift/share model does not explain why shifts have occurred, but the results provide a basis for informed conjecture and subsequent interviews about whether any of the shifts could be related to BART's existence.

The next step in the sequence was to evaluate individual economic sectors or activities that may have experienced significant BART impacts. An extensive interview program, involving 85 interviews, was designed and carried out to evaluate:

- The role of mass transit in location decisions (whether the location choice was to move to the Bay Area, to leave, or to stay;
- The perceptions and conclusions about operating efficiencies in selected sectors and occupations; and
- Effects of BART on decisionmakers' attitudes about the San Francisco Bay region as a place to locate or invest. This last query relates to the question of image of the region.

Intensive case studies were selected after the evaluation of aggregate data and after the program of key-informant interviews. The intent of the case studies was to confirm or refute an economic advantage because of a confirmed or hypothesized impact of BART or the NBA. In effect, the case studies represent a search for direct causality, if the data suggest that there is a correlation between a BART or NBA characteristic and a shift in economic activity. In fact, the basic research strategy was to seek "circumstantial evidence" (not statistical proof) from the data and to follow such evidence with more qualitative techniques -- interviews and case studies -- that were to be used to identify BART impacts.

D. Theoretical Considerations Governing Selection of the Methodology

For readers interested in the economic theory which supports our selection of a research approach, involving identification

of changes in the economy through shift/share analysis and confirmation of refutation of transit's causal influence through interviews, this section documents the theoretical considerations in evaluating economic effects of a transportation system. To the extent that this is a theoretical discussion, it assumes familiarity with economic concepts and terminology.

The research approach used in this study is based on the premise that the growth potential of certain industries demands access to factors of production (e.g., skilled labor), markets (e.g., retail shoppers), and related industries or services (cluster economies and agglomeration effects). This access theory (or input/output access theory) of regional growth differentials was first applied in the massive empirical U. S. regional development study done by Perloff, Dunn, Lampard and Muth.¹ Briefly, their approach was to tabulate shifts in economic activity among regions by industry sector (using the shift/share analysis which is described in Appendix A) and then to evaluate the regional factors which contributed to the growth or decline of that particular industry. The advantages and limits of this combination shift/share and case study approach are discussed in Perloff and Wingo, and in Hoover.² Lichtenberg's classic case study of urban locational advantages and agglomeration economies also used a sequential research strategy of the type used in this project.³

Thus, there is precedent for the approach of evaluating a large amount of data on the employment characteristics of each of the Bay Area's industries, comparing the growth profile of each of the region's economic sectors to the growth experience of other regions and, once identifying anomalies, investigating the cause for those anomalies through a case study method.

The remainder of this section describes the potential alternative approaches and the limitations which prevented their use in this study. The full explanation of the strengths of the shift/share analysis used in this study is contained in Appendix A.

¹Perloff, Harvey S., Eric S. Dunn, Eric E. Lampard and Richard F. Muth, Regions, Resources and Economic Growth, Baltimore, Johns Hopkins Press, 1960.

²Perloff, Harvey S. and Lowdon Wingo, Issues in Urban Economics, New York, Alfred Knopf, 1971; Hoover, Edgar M., An Introduction to Economics, New York, Alfred Knopf, 1971.

³Robert M. Lichtenberg, One Tenth of a Nation, Cambridge, Harvard University Press, 1960.

The economic effects of the existence of transportation systems are, in part, the subject of classic location theory. Unfortunately, as noted recently in a comparable context where the subject was the use of location theory to prepare forecasts of industrial location:

"Location theory analyzes the location of firms by studying the comparative costs of different firms. Thus, location theory attempts to answer the following type of question: Given several sources of raw materials and several markets, where will a firm locate? The analysis can be complicated by varying the processing and transfer costs at various locations. A summary of the literature on location theory would be out of place in this study because location theory not only has little empirical content, but offers very unsurprising theoretical conclusions such as, 'long-run competitive equilibrium in a space economy is the same as in a nonspace economy; that is, firms will produce where marginal cost equals marginal revenue and average cost equals price.' Location theory tends to be abstract and usually concerns itself with ideal worlds in which only a few variables are important in location decisions, whereas we must analyze industrial growth in the real world with all of its complications. Furthermore, even if location analysis did offer a rigorous and complete analysis of industrial growth, it would be useless for our project since it requires information which is simply not available. To apply location theory, at a minimum one would need a complete matrix of transport costs to and from every county for every different product, a matrix of processing costs at each county for each product in every county. Location theory may thus be applicable if one intended to study intensively one small industry producing a well-defined product with known processing and transportation costs, but application of the theory on a universal basis is hopeless at present."¹

This study was concerned with changes in costs and other factors within a single region, rather than the cost of movement between regions. Nonetheless, the general conclusion quoted above is equally true but, as discussed below, so is the qualifying final sentence in the quotation regarding the desirability of concentrating on specific industries and specific cases.

¹Burrows, James C., Charles E. Metcalf and John B. Kaler, Industrial Location in the United States, Lexington, D. C. Heath & Company, 1971, p. 6.

In fact, the literature tends to present location and spatial decision theory in the abstract, but provides meaningful empirical evidence only in terms of specific and often narrowly defined industrial activities.¹ Further, the specific research that has been published emphasizes production and distribution rather than the "office-oriented" activities that can be conjectured to be most significantly impacted by urban mass transit systems.

Despite this discouraging prognosis, existing theories of regional growth and existing models of the Bay Area economy were reviewed in order to derive a coherent theoretical framework for evaluating transit service impacts. In adopting a methodology, several alternative theories of regional growth and their concomitant empirical models were evaluated.

Two distinct perspectives emerge from a review of regional growth theory and models. The first approach to regional growth is based on neoclassical general equilibrium assumptions. The primary advantage of equilibrium frameworks is their amenability to quantitative analysis and empirical application. Models within this category include regional econometric and input-output models which are characteristically mini-versions of their national counterparts.

The primary disadvantage of equilibrium models is that they omit the spatial variables that transit services might affect. The neoclassical region is a homogeneous plane without locational frictions. In addition, most applied equilibrium models are demand driven (often by national aggregates), whereas transit services affect the supply of labor and access to land. A regional resource-base framework, based on aggregate neoclassical production functions (usually Cobb-Douglas) could be used to analyze impacts on productivity and labor supplies, but this particular model has never been implemented regionally.²

For the Bay Area, both the econometric formulation evaluated previously by the Metropolitan Transportation Commission (MTC)³

¹A discussion of this situation is provided in Richardson, Harry W., Regional Economics: Location Theory Urban Structure and Urban Change, New York, Praeger, 1969, pp. 342-347.

²Hirsch, Werner Z., Urban Economic Analysis, New York, McGraw-Hill, 1973, pp. 223-231, 259-263.

³Roberts, B. F., "Economic Models for the BART Impact Study," prepared for the Metropolitan Transportation Commission, December 1974.

and this project's input-output model suffer from the above limitations with regard to measurement of transit service impacts. In summary, the assumptions upon which available equilibrium models are based preclude tests of hypotheses regarding changes in spatial variables, externalities (cluster economies) or specific impacts on factor productivity.

A second perspective on regional economic development, which emphasizes internal or "cumulative growth" processes, has led to what Professor William Alonso, a noted and frequently cited theoretician on regional economic growth, calls polarized space models. The major advantage of polarized space models is that they analyze the contribution of locational (accessibility to markets, resources and labor) and structural (cluster economies, industrial mix, city size, public infrastructure) factors to a region's growth. In other words, cumulative growth theories emphasize the spatial and supply factors which BART services might hypothetically affect.

The major disadvantage of polarized space theories is that the interactions and relationships they posit are very difficult to model, much less empirically. As a result, very few applied models of this type have been developed, and none exists for the San Francisco Bay Area.

One of the few empirical polarized space frameworks which has potential for analyzing transit service impacts is the agglomeration or income potential model. Polarized space formulations attempt to quantify or weight the influence of the matrix of locational factors which make a certain site economically productive (its "income potential"). Utilizing gravity equations for spatial frictions and land values as a proxy for income potential, these models attempt to demonstrate cluster economies in central business districts (CBDs), advantages or proximity to labor pools and markets, effects of transportation improvements, etc. Richardson¹ presents a general formulation based on observations from many standard metropolitan statistical areas (SMSAs), while Sakagami, et al.² have used an economic potential formulation to estimate the benefits of

¹Richardson, Harry W., "Agglomeration Potential: A Generalization of the Income Potential Concept," Journal of Regional Science, Volume 14, No. 3, December 1974, pp. 325-337.

²Sakagami, Koyu, Nobuyoshi Kobayashi and Ryoichi Kinoshita, "Economic Potential and Its Application for a Regional Growth Model with the Investment Plan of Transportation Facilities," Annals of Regional Science, Volume III, No. 2, December 1969, pp. 1-14.

improved transportation on the Tokyo economy. Other comparative studies have shown that agglomeration or cluster economies do exist in urban centers, especially for manufacturing industries. These analytic directions, however, cause several problems in evaluating economic and financial impacts of BART service.

First, what could these models tell us about BART's contribution to agglomeration economies? A comparative study could determine that rapid transit is a significant factor in determining income potential, but how much does it contribute relative to other variables? Does BART cause the CBD to grow or does it affect the labor supply of certain industries directly? These aggregate comparative models could not answer this type of question.

Second, variables would be very difficult to measure for the wide range of factors and flows which affect agglomeration potential, especially considering the type of economic activities BART serves (central offices, particularly finance, insurance, real estate, etc.). The only variable Richardson formulated as a proxy for income potential was per capita land values caused by BART.

These limitations led to rejection of a methodology which measured the income potential of a particular location. The approach adopted, shift/share analysis, however, is similar. It evaluates transit impacts on the income potential of specific industries.

A possible BART impact which was excluded from the scope of this project, except as an object of the interviewing program, should be mentioned: the impact on relative labor productivity in the region.

The economic profile of the Bay Area is dominated by the finance and service sectors. These sectors depend upon the interaction of professionals and communication of both the verbal and written word. It is plausible that BART service could facilitate that kind of interaction, while it would not facilitate productivity in a commercial sector involving goods rather than services, since it has no impact on freight deliveries. Thus, significant BART impacts on productivity in the region might be identified in the finance and service sectors.

Unfortunately, there are no known measurements of true regional productivities in any industry. Even at the national level, where more extensive economic accounts are available than for

any region, attempts at analyzing sectoral productivity changes have met with only limited success. Analyses of the sources of productivity increases have been extremely conjectural.¹

This limitation to quantitative or statistical analysis of productivity by industry within the region affected this project's research into BART's impact into business efficiencies. In order to identify any efficiencies which would make the Bay Area a more attractive place for commerce or business to locate, the individual sector or activity case study explored efficiency impacts with the key informants and the directed interviewees. No evidence of this effect, however, was discovered. Further, business use of BART has been limited.

¹Four recent articles consider these potential productivity impacts: Grossman, Michael and Victor Fuchs, "Intersectoral Shifts and Aggregate Productivity," Annals of Economic and Social Measurement, National Bureau of Economic Research, Vol. II, No. 3, July 1973; Mark, Jerome, "Progress in Measuring Productivity in Government," Monthly Labor Review, Bureau of Labor Statistics, Vol. 95, No. 12, December 1972; Denison, Edward, "The Shift to Services and the Rate of Productivity Change," Survey of Current Business, Department of Commerce, Vol. 53 No. 10, October 1973; Beebe, Jack, "Note on Intersectoral Shifts and Economic Productivity Changes," Annals of Economic and Social Measurement, National Bureau of Economic Research, Vol. 4, Summer 1975.

III. BART'S IMPACT ON ACCESSIBILITY TO EMPLOYMENT AND ITS USE FOR BUSINESS

Evaluating the impact of BART on the competitive advantage of the region's business and commerce requires comparison of the potential work force's accessibility to employment, both with BART and without BART. This analysis focuses upon accessibility to employment for actual and potential members of the labor force, including underemployed and ethnic minorities, since better utilization of these labor resources would represent a notable economic impact.

The approach assumes travel time lengths provide an appropriate measurement of accessibility to employment in that they reflect the relative ease or difficulty with which a worker can travel to a job. If BART were to provide a substantial improvement in work-trip travel time for underemployed and unemployed groups, this could be interpreted as improved accessibility to employment for these groups. If employment is more accessible to the population, industry perceives a regional economic advantage from improved access to a larger work force.

This study also evaluates actual BART usage by various socioeconomic subgroups in their journeys to work. Data from the 1976 BART Passenger Profile Survey was utilized to determine patterns of usage of BART for the journey to work.¹ A third accessibility issue with economic implications is the impact of BART on business efficiencies. Data from the Passenger Profile Survey were utilized to determine the amount of business-related BART usage.

A. Employment Accessibility

The analysis of the potential impact of BART on job accessibility during peak-period travel is summarized in Table III-1. The table indicates that BART offers average travel time improvements to high-employment centers for all socioeconomic groups shown.² The degree of improved average accessibility to

¹ See Peat, Marwick, Mitchell & Company, "Analysis of BART Accessibility Impacts," a working note prepared for the Metropolitan Transportation Commission, December 1976, for discussion of the analysis, significance and the shortcomings of the results.

² Defined as the 100 traffic zones in the six-county area with the highest employment. Sixty of these are in the three BART counties.

Table III-1

AVERAGE ACCESS TIME FOR ALL ZONES IN THE THREE-COUNTY
REGION TO EMPLOYMENT CENTERS¹ BY POPULATION SUBGROUP
(in minutes)

<u>Population Subgroup</u>	<u>Without BART</u>	<u>With BART</u>	<u>Difference</u>	<u>Percent Difference</u>
Total Population	43	35	8	19%
Households below Poverty Level	31	28	3	10%
Households with High Incomes	46	36	10	22%
Blue Collar	43	35	8	19%
Unemployed	37	32	5	14%
Households Without Automobiles	25	24	1	4%
Nonwhite	30	27	3	10%

¹ Defined as the top 100 employment zones within the six-county area.

Source: Peat, Marwick, Mitchell & Co., "Analysis of BART's Accessibility Impacts," prepared for the Metropolitan Transportation Commission, December 1976, p. 36.

employment offered by BART is not as great for the "disadvantaged" groups as for the total population and higher-income groups. In aggregate, BART provides a 19 percent improvement in average travel time over the NBA to the top 100 employment zones for the total population. Higher-income households experience an even greater travel time saving with BART, 22 percent.¹ Households below poverty level and nonwhite households

¹ Higher income households are defined as having incomes greater than \$20,000 per year, according to the 1970 Census. Households below the poverty level, according to the 1970 Census, are those earning less than \$4,000 per year.

would save only 10 percent in their average journey to work if it were to one of the top 100 employment zones.¹

These transportation benefits of BART service may appear to favor higher-income households disproportionately. Part of the reason the lower-income groups experience less benefit from BART, however, is that their residential neighborhoods would be served by very good bus service in the NBA, reducing the difference in the travel time between the two scenarios.

Any comparison of the travel time advantages of BART must be compared to an alternative transportation system. The findings of this analysis will be heavily conditioned by the definition of the No-BART Alternative. The NBA is assumed to consist of a high level of bus service, a level of service which has particularly strong implications for the residential zones which are not located on the BART line. The difference between the type of service received in these neighborhoods with and without BART will be small. If the majority of low-income households live in these neighborhoods, BART will not appreciably change their access to employment accessibility. Despite this observation, it may not imply that BART is failing to serve its transportation objectives, which at the time it was planned, did not include specifically serving low-income households.

An important public policy question, however, is whether BART did improve access to employment for the unemployed, regardless of its intention. The average access time for the unemployed from all zones in the three-county region to the 100 top employment zones within the nine-county area was reduced 14 percent, reflecting a five-minute difference in the average access time between BART's 32-minute average travel time and the NBA's 37-minute travel time. Is this significant? Under the theory that the unemployed have a lower time value than the employed or higher-income households, probably not. In behavioral terms, it is unlikely that the employment opportunity was perceived as considerably greater with BART than it would have been without BART, despite the statistically improved average accessibility. Certainly, the difference is not substantial enough to outweigh the arguments that unemployment is less a function of accessibility than better information on employment opportunities, social situations and training.

Improvement in access for the employed, particularly households with high incomes, is considerably greater. The average access time for households with high income improves 22 percent, a 10-minute improvement over the 46-minute average access time

¹The analysis considers average travel time, however, which can be misleading.

without BART. This socioeconomic characteristic of BART service probably satisfies one of its early transportation objectives, although that objective was not explicitly to serve higher-income households. BART was planned to relieve the congestion pressures on long-haul highway corridors, from the suburbs into the CBDs. From Table III-1, it would appear that it succeeds in this objective if the households with higher income are those which reside in the suburbs. It also indicates that the NBA is less effective in serving the transportation needs of the residential patterns of households with high incomes.

The importance of these characteristics of BART's impact on accessibility to employment for other areas planning rapid transit is dependent on the objectives of rapid transit in those areas. If the objective is to increase employment accessibility for the unemployed, the transit alternatives must specifically serve the residential communities in which the unemployed or low-income households reside. If a fixed-guideway system does not serve those communities, or if the route to employment opportunity for residents of those neighborhoods is inconsistent with the route of the fixed guideway system, there may be very little difference reflected between the rail alternative and a bus alternative.

B. Racial Characteristics of BART Riders

Public policy concern with the potential improvement to employment accessibility through transit service bears not only on the unemployed generally. There is also concern that transit improve the employment opportunities of minorities. The impact of BART service on accessibility to employment among minorities relates to the issues of the previous section. Table III-2 illustrates the racial characteristics of BART riders and Table III-3 reflects the racial characteristics of the BART service area.

The racial characteristics of BART riders are taken from the BART 1976 Passenger Profile Survey. In fact, this survey relates patronage characteristics only to AM peak and off-peak and represents trips rather than riders. Therefore, the same passenger could make several trips and would show up in the survey response more than once. For ease of description, the word "rider" is used for "trip".

While the racial characteristics of actual BART ridership are similar to the characteristics of the BART service area population, it should not be expected that transit patronage, regardless of mode, should be in the same proportion as the racial composition of the population. Table III-4 illustrates an

Table III-2

RACIAL PROFILE OF BART RIDERS

White	72.7%
Black	11.2%
Spanish-American	5.9%
Asian	8.4%
Other	1.8%

Source: BART 1976 Passenger Profile Survey, Metropolitan Transportation Commission.

Table III-3

RACIAL PROFILE OF THE BART SERVICE AREA

	<u>Alameda</u>	<u>Contra Costa</u>	<u>San Francisco</u>
White	67.2%	80.7%	57.2%
Black	15.0%	7.5%	13.4%
Spanish-Surname	12.6%	9.3%	14.2%
Other	5.2%	2.5%	15.2%

Source: Bureau of the Census, 1970.

Table III-4

BART WORK-TRIP RIDERSHIP
AS A PERCENT OF PATRONAGE BY RACIAL GROUP

White	59%
Black	63%
Spanish-American	61%
Asian	57%

Source: 1976 BART Passenger Profile Survey, Metropolitan Transportation Commission.

interesting characteristic, the percentage of trips on BART, by race, which have a work-trip purpose. These statistics indicate the consistency among riders, by race or ethnic group, who ride BART for a commute purpose.

Table III-5 illustrates the number of BART riders, by racial or ethnic characteristics, whose work-trip destinations are within the central business districts of either San Francisco or Oakland. The percentages of work-trip destinations among riders are highly similar for the four racial or ethnic groups evaluated. While this reflects the employment opportunity in each of these central business districts, it also indicates that the home-to-work trip to either of these areas of high employment potential does not serve any single racial or ethnic group disproportionately. (Naturally, this conclusion, and the previous one, could be misleading if data on employment by racial or ethnic characteristics within these central business districts showed a disproportionate number of jobs were held by any single ethnic group.)

Examination of Passenger Profile Survey data did reveal that there is some evidence of reverse commuting, from urban residential areas having a high proportion of minority residence to suburban areas, but the magnitude appears small. This would indicate that the impact of BART on transporting urban disadvantaged groups to suburban locations of employment has not been great. This may also appear true in other locations undertaking other alternatives analyses. If the transportation model evaluating alternatives is based upon serving the suburban-to-downtown peak-period demand, headways in the commute direction will be substantially shorter than those for the reverse commute. The longer headways for the reverse commute will increase the travel time and reduce the demand for urban residents to take transit to the suburbs for the reverse commute.

C. Business Use of BART

If substantial use of BART were made by employees in the course of business, it might be possible to identify an efficiency advantage from BART's transportation service for Bay Area businesses. It had been conjectured that uses ranging from executives meeting for lunch to rapid and secure messenger service could be facilitated by the uses of BART, particularly between the business centers of San Francisco and Oakland and the growing employment nodes in the suburbs. In fact, less than 3.3 percent of the responses to the BART Passenger Profile Survey in 1976 indicated business-related use of BART during the peak period, and only 6.6 percent in the off-peak. While there were strong indications in the interviewing program that business use that does occur would not be replaced by use of alternate transit modes without BART, neither the ridership statistics nor the interviewing program indicates a significant impact.

Table III-5

PERCENTAGES OF RACIAL GROUPS RIDING BART
HAVING DESTINATIONS IN HIGH EMPLOYMENT CENTERS

<u>Employment Center</u>	<u>White</u>	<u>Black</u>	<u>Spanish- American</u>	<u>Asian</u>
<u>San Francisco CBD</u>				
Civic Center	9%	13%	6%	7%
Powell Street	11%	8%	11%	11%
Montgomery Street	<u>28%</u>	<u>22%</u>	<u>28%</u>	<u>31%</u>
TOTAL	48%	43%	45%	49%
<u>Oakland CBD</u>				
Lake Merritt	2%	3%	3%	3%
MacArthur	1%	2%	2%	0%
19th St. Oakland	7%	5%	5%	7%
12th St. Oakland	<u>5%</u>	<u>5%</u>	<u>5%</u>	<u>3%</u>
TOTAL	15%	15%	15%	13%
Other Work-Trip Destinations	<u>37%</u>	<u>42%</u>	<u>40%</u>	<u>38%</u>
TOTAL Work-Trip Destinations by Race	100%	100%	100%	100%

Source: 1976 BART Passenger Profile Survey, Metropolitan
Transportation Commission

IV. EFFECT OF TRANSIT SERVICE ON THE COMPETITIVE ADVANTAGE AND EFFICIENCY OF BAY AREA BUSINESS OPERATIONS

The Composite Report, which described BART to the voters in 1962, expressed an expectation that prevails in transportation planning today: "The rapid transit system would improve the area's living and working conditions, economic efficiency and availability of workers, and attract a larger share of the nation's future growth." The living and working conditions of the region could be improved by reducing the time and cost of the journey to work or to recreation. Economic efficiency would be enhanced if BART could be used to expedite or facilitate the daily business interaction of employees or firms. The availability of workers would be increased through improving accessibility to employment for the population of the region, simultaneously affecting the employment opportunity of the unemployed and the size of the work force accessible to any employer.

This section evaluates the implication which each of these improvements might have on the broader economic profile of the region. Will rapid transit, through improving working conditions, economic efficiency, the availability of workers and the employment opportunity of the population, increase the productive use of regional resources to the extent that the region has a competitive advantage in attracting future national growth? Will the region attract more than its share of new economic growth? Will the effect of transit on productivity of the region's resources, and even its effect on the region's image, cause corporations to locate (or expand) in this region rather than another?

The research approach involved identifying whether the Bay Area did receive a greater share of national growth during the time period that BART might have influenced location decisions. If so, was this growth the result of BART?

The evaluation of BART's impact on regional development does not involve changes in corporate location within the region, as a result of BART. Intraregional location decisions represent land use impacts and would have no net effect on the economic activity of the entire region.

A. Shifts in Bay Area Employment Since 1965

The total increase (or decline) in employment in any industry can be described by comparison with three standards:

- Total employment growth in all industries;

- Employment growth in the industry being considered; and
- Employment growth in the industry in a particular geographic region, compared to total growth in the industry.

The third component provides an indication of the "competitive shift" in employment for a given industry in a region and may indicate that the region has a competitive advantage, compared to other regions in the United States.¹

The same type of analysis can begin with an employment base smaller than the entire United States. Employment increases can be compared using a state or a region as a base, and a smaller geographic area (e.g., the BART counties) as the area being studied. Such an analysis was used as the first step to isolate competitive shifts that occurred between 1965 and 1973, and that might have been the result of BART.

For the purposes of this analysis, it has been assumed that no major relocation to the Bay Area on account of BART would have occurred for at least two years after settlement of the 1963 taxpayers' suit, which assured the legitimacy of BART's mandate. On the other hand, by 1973, decisions based on original projections of service commencement or even actual service should have been implemented.²

The employment in 66 Bay Area industries or industry groups was evaluated to determine which industry group increased employment to an extent which could not be explained by national trends in economic growth of each sector or comparable changes in the industry mix of the economy of other headquarters cities. The analysis revealed five industry groups which appeared to gain substantially more employment than could be explained by comparison with other areas. It could be that this unusual growth might have been a result of BART.

¹The analysis of employment growth by component is referred to as shift/share analysis. For a complete discussion and summary of findings, see Appendix A.

²It is possible that the bad press BART received in the early 1970s and its failure to meet service-level expectations have deterred economic development which might eventually occur. This hypothesis would warrant a revision of this analysis at some future date more likely to be associated with full-service levels. Even if data had been available for the years between 1973 and 1976, it is unlikely that there would be any substantial change in the findings.

Table IV-1 identifies the industry groups with otherwise unexplained growth and illustrates how they fared in the Bay Area, relative to 16 other metropolitan areas which are primarily corporate headquarters and business centers. The table also compares the growth of these industry groups with the industrial growth experienced in seven West Coast metropolitan areas. Finally, it compares the three-county BART service area with the experience of the nine-county Bay Area. This final comparison would provide a general indication of the intraregional location patterns which occurred during BART's construction period.

In comparison with other headquarters SMSAs, the six industry groups which provide the majority of employment in the BART service area showed a positive competitive shift in employment over the time period 1965 to 1973.

Table IV-1 illustrates that the employment in the dominant sectors of the BART service area grew at a faster pace than in other metropolitan areas in the country, although this performance was less dynamic in comparison with the growth experienced by West Coast metropolitan areas. Comparison of the three-county BART service area economy with other West Coast SMSAs and with the nine-county greater Bay Area indicates that only the government sector and the central office function show a consistent competitive shift.

In Table IV-2, the sectors of nine Bay Area counties are ranked by a weighted score reflecting the percentage of competitive shift times the 1965 employment in that sector. This table compares the history in the nine counties with the performance of the nation's headquarters SMSAs and West Coast SMSAs.¹ The employment by industry group is documented in Table IV-3.

The same ranking approach on competitive shifts in industry sectors or groups for the three-county BART District is illustrated in Table IV-4. Table IV-5 contains the base employment data. The data on the San Francisco-Oakland SMSA are contained in Tables IV-6 and IV-7.

¹The employment bases for the individual counties and the control and comparison groups are contained in Appendix B. The industrial sectors illustrated in the tables have included aggregation of certain of the 66 sectors for which there were disclosure problems with the data. Therefore, the tables have fewer than 66 sectors.

Table IV-1

SHIFTS IN EMPLOYMENT IN THE BART SERVICE AREA
1965-1973

Sector	Competitive Shift in Employment in the BART Service Area (as Percent of 1965 Employment)		
	Compared to Other Headquarters SMSAs ¹	Compared to West Coast SMSAs ¹	Compared to Nine-County Bay Area
Government	+ 40%	+ 38%	+ 44%
Central Office ² (except manufacturing)	+225	+182	- 10
Services	+ 15	- 5	- 7
Finance	+ 17	- 2	- 5
Manufacturing	+ 5	- 14	- 20

¹SMSA: Standard Metropolitan Statistical Area.

²Ancillary central office employment includes financial, construction, transportation and service firms' administrative and auxiliary units.

Source: McDonald & Grefe, Inc.

The conclusions of these weighted rankings are that the sectors summarized in Table IV-1 -- government, central office services, services, finance and manufacturing -- are the only ones in which the region, whether defined as the nine counties, the three counties or the San Francisco-Oakland SMSA, shows consistent growth in excess of what can be explained by trends elsewhere.

B. Investigation of BART's Impact on Competitive Shifts

The numerical analysis of shifts in employment was intended to identify industries that possibly had enjoyed a competitive advantage because of BART. It could not be said to demonstrate

Table IV-2

THE COMPETITIVE SHIFT IN ECONOMIC ACTIVITY
NINE-COUNTY SAN FRANCISCO BAY AREA
A WEIGHTED¹ RANKING 1965 - 1973

HEADQUARTERS SMSA-S			WEST COAST SMSA-S		
RANK	INDUSTRY	WEIGHTED SCORE	RANK	INDUSTRY	WEIGHTED SCORE
1	ALL MANUF.	72481.	1	ELECT MACHINERY	21138.
2	SERVICES	45636.	2	ALL MANUF.	16125.
3	RETAIL	38704.	3	BANKING	5341.
4	ELECT MACHINERY	36747.	4	ALL TRANSPORTATION	4088.
5	ALL TRANSPORTATION	28768.	5	HEALTH SERVICES	3309.
6	ALL FINANCE	21359.	6	SERVICES	3271.
7	HEALTH SERVICES	15493.	7	ALL FINANCE	2507.
8	MACHINERY /NO ELECT	13868.	8	TRAN EQUIPMENT	2181.
9	WHOLESALE	8229.	9	BUS. SERV.	1973.
10	PERS. SERVICES	8018.	10	RETAIL	1962.
11	SHIP, AIR CARGO	7738.	11	EDUC. SERVICES	1667.
12	BUS. SERV.	7464.	12	CONST. AUXILIARY	1510.
13	EDUC. SERVICES	6478.	13	INSTRUMENTS	1135.
14	NONPROFIT ORGANIZ.	5108.	14	NONPROFIT ORGANIZ.	1114.
15	BANKING	4776.	15	PERS. SERVICES	994.
16	OTHER TRANSPORTATION	4341.	16	MACHINERY /NO ELECT	704.
17	REAL ESTATE	4102.	17	APPAREL	576.
18	FOOD PROC.	3885.	18	REAL ESTATE	491.
19	TRAN EQUIPMENT	3290.	19	SECURITIES	476.
20	APPAREL	3091.	20	FINAN. AUXILIARY	453.
21	INSTRUMENTS	2632.	21	SERVIC AUXILIARY	321.
22	MISC. MANUFACTURING	2269.	22	MISC. MANUFACTURING	162.
23	HOTELS	2198.	23	TEXTILES	-92.
24	TRANS SERVICES	1736.	24	TRANS SERVICES	-107.
25	PRINTING	1542.	25	AGRIC. SERVICES	-241.
26	CONST. AUXILIARY	1493.	26	HOLDING COMPANIES	-365.
27	PLAST-GLASS PRODUCTS	1366.	27	OTHER TRANSPORTATION	-373.
28	ENTERTAINMENT	1165.	28	TRANS. AUXILIARY	-565.
29	SERVIC AUXILIARY	949.	29	PETROLEUM	-663.
30	SECURITIES	581.	30	PASS. TRANSPORTATION	-717.
31	FINAN. AUXILIARY	514.	31	HOTELS	-841.
32	TRANS. AUXILIARY	162.	32	PLAST-GLASS PRODUCTS	-1021.
33	AGRIC. SERVICES	144.	33	PAPER PRODUCTS	-1197.
34	TEXTILES	74.	34	FOOD PROC.	-1552.
35	HOLDING COMPANIES	-22.	35	ENTERTAINMENT	-1636.
36	PETROLFUM	-624.	36	CHEMICALS	-1817.
37	CHEMICALS	-717.	37	MISC. SERVICES	-2172.
38	MISC. SERVICES	-1122.	38	STAT-LOCAL GOVT.	-2177.
39	INSUPANCE	-1197.	39	BLD. CONSTRUCTION	-2677.
40	PAPER PRODUCTS	-1230.	40	INSURANCE	-2726.
41	WOOD PROD.	-1721.	41	PRINTING	-2736.
42	PASS. TRANSPORTATION	-1957.	42	LEGAL SERVICES	-2813.
43	LEGAL SERVICES	-2879.	43	SHIP, AIR CARGO	-2957.
44	TRADE CONTRACTORS	-2979.	44	WOOD PROD.	-3471.
45	FAB. METALS	-3306.	45	TRADE CONTRACTORS	-3863.
46	BLD. CONSTRUCTION	-7080.	46	FAB. METALS	-4251.
47	FED. GOV.	-7786.	47	WHOLESALE	-5349.
48	ALL CONSTRUCTION	-10902.	48	ALL CONSTRUCTION	-7490.
49	ALL GOVT.	-14363.	49	FED. GOV.	-10786.
50	STAT-LOCAL GOVT.	-102424.	50	ALL GOVT.	-20333.
51	UTILITIES	*****	51	UTILITIES	*****
52	MANUF. AUXILIARY	*****	52	MANUF. AUXILIARY	*****
53	COMMUN.	*****	53	COMMUN.	*****
54	PRIM METALS	*****	54	PRIM METALS	*****
55	MINING	*****	55	MINING	*****

¹ The score represents the competitive shift in percent multiplied by the 1965 sector employment.

Source: U.S. Department of Commerce, Bureau of Economic Analysis and McDonald & Greffe, Inc.

Table IV-3

EMPLOYMENT BY INDUSTRY GROUP
NINE BAY AREA COUNTIES
1965 - 1973

SECTOR DESCRIPTION	1965 EMPLOYMENT	1973 EMPLOYMENT	*	SECTOR DESCRIPTION	1965 EMPLOYMENT	1973 EMPLOYMENT
1 AGRIC. SER	3646.	5310.	*	34 REAL ESTAT	17563.	26646.
2 MINING	N/A	N/A	*	35 HOLDING CO	1717.	2707.
3 ALL CONSTR	85397.	78608.	*	36 ALL FINANC	55946.	134264.
4 BLD. CONST	26489.	24908.	*	37 HOTELS	16618.	21930.
5 TRAC. CONT	42032.	38826.	*	38 BUS. SERV.	39038.	65019.
6 ALL MANUF.	290907.	346732.	*	39 PERS. SERV	35913.	38964.
7 FOLD PROD.	41151.	36884.	*	40 ENTERTAINM	14212.	18052.
8 TEXTILES	66P.	779.	*	41 HEALTH SER	46425.	84699.
9 APPAREL	8556.	11621.	*	42 LEGAL SERV	7745.	9658.
10 WOOD PROD.	9572.	8575.	*	43 EDUC. SERV	14962.	26540.
11 PRINTING	24076.	24796.	*	44 NONPROFIT	19415.	30792.
12 CHEMICALS	13085.	14034.	*	45 MISC. SERV	1719c.	22685.
13 MACHINERY	22923.	39014.	*	46 SERVICES	210290.	320032.
14 ELECT MACH	34553.	70334.	*	47 CONST. AUX	341.	1672.
15 TRAN EQUIP	18927.	20573.	*	48 MANUF. AUX	N/A	N/A
16 PAPER PROD	10487.	9827.	*	49 TRANS. AUX	767.	1690.
17 PETROLEUM	5845.	4508.	*	50 FINAN. AUX	109.	655.
18 PLAST-GLAS	13313.	15059.	*	51 SERVIC AUX	819.	2033.
19 PRIM METAL	N/A	N/A	*	52 TOTAL EMPL	1100275.	1422163.
20 FAB. METAL	21944.	22459.	*	53 AGRICULT.	N/A	N/A
21 INSTRUMENT	3904.	6458.	*	54 FORESTRY	N/A	N/A
22 MISC. MANU	30824.	26440.	*	55 MINING SUP	N/A	N/A
23 ALL TRANSP	105081.	137825.	*	56 OTHER CONS	17473.	16432.
24 PASS. TRAN	10260.	10598.	*	57 MUSEUMS	8.	286.
25 SHIP. AIR	26537.	37492.	*	58 RETAIL SUP	N/A	N/A
26 TRANS SERV	3328.	5784.	*	59 MINING AUX	881.	57.
27 OTHER TRAN	21519.	25178.	*	60 WHOLE. AUX	N/A	N/A
28 COMMUN.	N/A	N/A	*	61 RETAIL AUX	N/A	N/A
29 WHOLESALE	90356.	105952.	*	62 UNCLASS.	N/A	N/A
30 RETAIL	212653.	285922.	*	63 UTILITIES	N/A	N/A
31 BANKING	35340.	53711.	*	64 FED. GOV.	50900.	53200.
32 SECURITIES	4061.	6637.	*	65 STAT-LOCAL	209300.	253300.
33 INSURANCE	37204.	41504.	*	66 ALL GOVT.	259400.	389500.

Source: U.S. Department of Commerce, Bureau of
Economic Analysis and McDonald & Greffe, Inc.

Table IV-4

THE COMPETITIVE SHIFT IN ECONOMIC ACTIVITY
THREE-COUNTY BART DISTRICT
A WEIGHTED¹ RANKING 1965 - 1973

HEADQUARTERS SMSA-S			WEST COAST SMSA-S			9-COUNTY BAY AREA		
RANK	INDUSTRY	WEIGHTED SCORE	RANK	INDUSTRY	WEIGHTED SCORE	RANK	INDUSTRY	WEIGHTED SCORE
1	ALL GOVT.	54570.	1	STAT-LOCAL GOVT.	62729.	1	STAT-LOCAL GOVT.	63555.
2	STAT-LOCAL GOVT.	24704.	2	ALL GOVT.	51420.	2	ALL GOVT.	61146.
3	SERVICES	19573.	3	BANKING	3591.	3	FED. GOV.	3372.
4	ALL TRANSPORTATION	13756.	4	EDUC. SERVICES	1667.	4	LEGAL SERVICES	1737.
5	ALL FINANCE	12406.	5	TRAN EQUIPMENT	1565.	5	EDUC. SERVICES	1499.
6	ALL MANUF.	8457.	6	BUS. SERV.	899.	6	MISC. MANUFACTURING	627.
7	HEALTH SERVICES	6125.	7	CONST. AUXILIARY	884.	7	MISC. SERVICES	444.
8	RETAIL	6036.	8	ELECT MACHINERY	841.	8	MINING	327.
9	BUS. SERV.	4235.	9	APPAREL	740.	9	FAB. METALS	251.
10	EDUC. SERVICES	3285.	10	MISC. MANUFACTURING	634.	10	APPAREL	216.
11	RANKING	3174.	11	SERVIC AUXILIARY	376.	11	TRAN EQUIPMENT	202.
12	APPAREL	3030.	12	FINAN. AUXILIARY	347.	12	WOOD PROD.	194.
13	ELECT MACHINERY	2876.	13	SECURITIES	217.	13	SERVIC AUXILIARY	146.
14	PRRS. SERVICES	2863.	14	LEGAL SERVICES	211.	14	FINAN. AUXILIARY	139.
15	SHIP, AIR CARGO	2694.	15	REAL ESTATE	77.	15	AGRIC. SERVICES	88.
16	REAL ESTATE	2337.	16	AGRIC. SERVICES	-4.	16	TEXTILES	9.
17	TRAN EQUIPMENT	2259.	17	TEXTILES	-70.	17	PETROLEUM	-26.
18	NONPROFIT ORGANIZ.	2118.	18	HOLDING COMPANIES	-459.	18	PASS. TRANSPORTATION	-128.
19	OTHER TRANSPORTATION	1345.	19	MINING	-504.	19	HOLDING COMPANIES	-147.
20	CONST. AUXILIARY	879.	20	INSTRUMENTS	-526.	20	SECURITIES	-208.
21	SERVIC AUXILIARY	828.	21	PETROLEUM	-669.	21	REAL ESTATE	-730.
22	MISC. MANUFACTURING	733.	22	PASS. TRANSPORTATION	-731.	22	ENTERTAINMENT	-292.
23	HOTELS	638.	23	MISC. SERVICES	-857.	23	BUS. SERV.	-299.
24	TRANS SERVICES	628.	24	NONPROFIT ORGANIZ.	-877.	24	BANKING	-348.
25	PRIM METALS	620.	25	TRANS SERVICES	-1016.	25	CONST. AUXILIARY	-369.
26	MACHINERY /NO ELECT	603.	26	HEALTH SERVICES	-1092.	26	TRANS SERVICES	-920.
27	ENTERTAINMENT	446.	27	ENTERTAINMENT	-1330.	27	SHIP, AIR CARGO	-913.
28	FINAN. AUXILIARY	375.	28	PERS. SERVICES	-1391.	28	PAPER PRODUCTS	-968.
29	SECURITIES	310.	29	HOTELS	-1585.	29	HOTELS	-970.
30	INSTRUMENTS	191.	30	ALL FINANCE	-1680.	30	PRIM METALS	-1001.
31	LEGAL SERVICES	175.	31	PLAST-GLASS PRODUCTS	-1717.	31	PLAST-GLASS PRODUCTS	-1053.
32	AGRIC. SERVICES	143.	32	WOOD PROD.	-1762.	32	INSTRUMENTS	-1070.
33	TEXTILES	72.	33	PAPER PRODUCTS	-1771.	33	CHEMICALS	-1298.
34	HOLDING COMPANIES	-165.	34	PRIM METALS	-1952.	34	NONPROFIT ORGANIZ.	-1712.
35	PLAST-GLASS PRODUCTS	-166.	35	OTHER TRANSPORTATION	-2210.	35	ELECT MACHINERY	-1915.
36	WOOD PROD.	-188.	36	SHIP, AIR CARGO	-2320.	36	OTHER TRANSPORTATION	-1928.
37	MISC. SERVICES	-228.	37	CHEMICALS	-2574.	37	PERS. SERVICES	-1797.
38	PETROLEUM	-630.	38	ALL TRANSPORTATION	-2792.	38	INSURANCE	-2438.
39	WOOD PROD.	-776.	39	FAB. METALS	-2871.	39	PRINTING	-2452.
40	MINING	-1023.	40	FED. GOV.	-3592.	40	BLD. CONSTRUCTION	-2635.
41	PRINTING	-1332.	41	FOOD PROD.	-3668.	41	ALL CONSTRUCTION	-2659.
42	FED. GOV.	-1655.	42	BLD. CONSTRUCTION	-4093.	42	FOOD PROD.	-2675.
43	PASS. TRANSPORTATION	1773.	43	INSURANCE	-4266.	43	HEALTH SERVICES	-3052.
44	PAPER PRODUCTS	-1793.	44	PRINTING	-4437.	44	TRADE CONTRACTORS	-3131.
45	CHEMICALS	-1802.	45	TRADE CONTRACTORS	-5483.	45	ALL FINANCE	-3554.
46	FAB. METALS	-2177.	46	MACHINERY /NO ELECT	-5484.	46	ALL TRANSPORTATION	-5536.
47	INSURANCE	-3241.	47	SERVICES	-6415.	47	MACHINERY /NO ELECT	-5809.
48	WHOLESALE	-4080.	48	ALL CONSTRUCTION	-7056.	48	SERVICES	-8422.
49	TRADE CONTRACTORS	-4945.	49	MANUF. AUXILIARY	-12300.	49	WHOLESALE	-10254.
50	MANUF. AUXILIARY	-4955.	50	WHOLESALE	-14266.	50	RETAIL	-16634.
51	BLD. CONSTRUCTION	-6492.	51	RETAIL	-15484.	51	MANUF. AUXILIARY	-25180.
52	ALL CONSTRUCTION	-9059.	52	ALL MANUF.	-22429.	52	ALL MANUF.	-31266.
53	UTILITIES	*****	53	UTILITIES	*****	53	UTILITIES	*****
54	TRANS. AUXILIARY	*****	54	TRANS. AUXILIARY	*****	54	TRANS. AUXILIARY	*****
55	COMMUN.	*****	55	COMMUN.	*****	55	COMMUN.	*****

¹The score represents the competitive shift in percent multiplied by the 1965 sector employment.

Source: U.S. Department of Commerce, Bureau of Economic Analysis and McDonald & Grefe, Inc.

Table IV-5

EMPLOYMENT BY INDUSTRY GROUP
THREE-COUNTY BART AREA
1965 - 1973

SECTOR DESCRIPTION	1965 EMPLOYMENT	1973 EMPLOYMENT	*	SECTOR DESCRIPTION	1965 EMPLOYMENT	1973 EMPLOYMENT
1 AGRIC. SER	1387.	2108.	*	34 REAL ESTAT	10991.	17698.
2 MINING	1785.	1140.	*	35 HOLDING CO	1470.	2171.
3 ALL CONSTR	50131.	43487.	*	36 ALL FINANC	71692.	96770.
4 HLD. CONST	14430.	10934.	*	37 HOTELS	12153.	15068.
5 TRADE CONT	25542.	20509.	*	38 BUS. SERV.	23712.	39194.
6 ALL MANUF.	159433.	158762.	*	39 PERS. SERV	21748.	21603.
7 FOOD PROD.	26341.	20935.	*	40 ENTERTAINM	9010.	11152.
8 TEXTILES	571.	675.	*	41 HEALTH SER	27498.	47110.
9 APPAREL	7789.	10795.	*	42 LEGAL SERV	4200.	6974.
10 WOOD PROD.	5392.	5024.	*	43 EDUC. SERV	5049.	10055.
11 PRINTING	17474.	15545.	*	44 NONPROFIT	14559.	21378.
12 CHEMICALS	9188.	8556.	*	45 MISC. SERV	10795.	14025.
13 MACHINERY	10596.	12230.	*	46 SERVICES	128998.	187895.
14 ELECT MACH	4505.	7255.	*	47 CONST. AUX	283.	1185.
15 TRAN EQUIP	11831.	13052.	*	48 MANUF. AUX	16913.	15992.
16 PAPER PROD	7037.	5621.	*	49 TRANS. AUX	N/A	N/A
17 PETROLEUM	5647.	4345.	*	50 FINAN. AUX	50.	400.
18 PLAST-GLAS	8450.	8731.	*	51 SERVIC AUX	589.	1608.
19 PRIM METAL	9058.	8299.	*	52 TOTAL EMPL	678071.	799779.
20 FAB. METAL	16117.	16746.	*	53 AGRICULT.	N/A	N/A
21 INSTRUMENT	1871.	2025.	*	54 FORESTRY	0.	0.
22 MISC. MANU	1439.	1861.	*	55 MINING SUP	N/A	N/A
23 ALL TRANSP	70459.	86881.	*	56 OTHER CONS	9826.	11136.
24 PASS. TRAN	8623.	8779.	*	57 MUSEUMS	185.	252.
25 SHIP, AIR	12440.	16642.	*	58 RETAIL SUP	N/A	N/A
26 TRANS SERV	2968.	4238.	*	59 MINING AUX	N/A	N/A
27 OTHER TRAN	16224.	17057.	*	60 WHOLE. AUX	4732.	5591.
28 COMMUN.	N/A	N/A	*	61 RETAIL AUX	N/A	N/A
29 WHOLESALE	67782.	69228.	*	62 UNCLASS.	1842.	2909.
30 RETAIL	124562.	150838.	*	63 UTILITIES	N/A	N/A
31 BANKING	26062.	39262.	*	64 FED. GOV.	58692.	63549.
32 SECURITIES	3622.	5712.	*	65 STAT-LCCAL	79089.	175949.
33 INSURANCE	24943.	25388.	*	66 ALL GOVT.	137910.	240558.

Source: U.S. Department of Commerce, Bureau of
Economic Analysis and McDonald & Greffe, Inc.

Table IV-6

THE COMPETITIVE SHIFT IN ECONOMIC ACTIVITY
SAN FRANCISCO-OAKLAND SMSA
A WEIGHTED¹ RANKING 1965 - 1973

HEADQUARTERS SMSA-S			WEST COAST SMSA-S		
RANK	INDUSTRY	WEIGHTED SCORE	RANK	INDUSTRY	WEIGHTED SCORE
1	SERVICES	28440.	1	MANUF. AUXILIARY	5715.
2	ALL TRANSPORTATION	21894.	2	BANKING	4588.
3	RETAIL	16285.	3	EDUC. SERVICES	3842.
4	ALL FINANCE	16260.	4	COMMUN.	3476.
5	ALL MANUF.	10876.	5	MISC. SERVICES	2157.
6	MANUF. AUXILIARY	9707.	6	MISC. MANUFACTURING	1525.
7	HEALTH SERVICES	7656.	7	CONST. AUXILIARY	1510.
8	SHIP, AIR CARGO	7460.	8	UTILITIES	1022.
9	EDUC. SERVICES	6027.	9	ALL TRANSPORTATION	876.
10	PERS. SERVICES	4551.	10	APPAREL	769.
11	BUS. SERV.	4310.	11	ALL FINANCE	566.
12	BANKING	4128.	12	FINAN. AUXILIARY	453.
13	APPAREL	3149.	13	SERVIC AUXILIARY	412.
14	NONPROFIT ORGANIZ.	3021.	14	SECURITIES	287.
15	MISC. SERVICES	2865.	15	TRAN EQUIPMENT	249.
16	REAL ESTATE	2493.	16	BUS. SERV.	138.
17	OTHER TRANSPORTATION	2200.	17	AGRIC. SERVICES	-42.
18	ELECT MACHINERY	2049.	18	TEXTILES	-92.
19	PRIM METALS	2022.	19	HOLDING COMPANIES	-237.
20	MISC. MANUFACTURING	1745.	20	TRANS SERVICES	-306.
21	WHOLESALE	1619.	21	NONPROFIT ORGANIZ.	-308.
22	COMMUN.	1595.	22	REAL ESTATE	-386.
23	CONST. AUXILIARY	1493.	23	TRANS. AUXILIARY	-565.
24	TRANS SERVICES	1394.	24	INSTRUMENTS	-567.
25	HOTELS	1341.	25	PETROLEUM	-631.
26	ENTERTAINMENT	1250.	26	PERS. SERVICES	-748.
27	MACHINERY /NO ELECT	1193.	27	PASS. TRANSPORTATION	-912.
28	TRAN EQUIPMENT	1067.	28	ENTERTAINMENT	-921.
29	SERVIC AUXILIARY	981.	29	HEALTH SERVICES	-952.
30	FINAN. AUXILIARY	514.	30	HOTELS	-1172.
31	FOOD PROC.	436.	31	PAPER PRODUCTS	-1226.
32	PRINTING	412.	32	PRIM METALS	-1344.
33	UTILITIES	395.	33	OTHER TRANSPORTATION	-1584.
34	INSTRUMENTS	391.	34	PLAST-GLASS PRODUCTS	-1708.
35	SECURITIES	383.	35	BLD. CONSTRUCTION	-1942.
36	AGRIC. SERVICES	201.	36	CHEMICALS	-2020.
37	TRANS. AUXILIARY	162.	37	WOOD PROD.	-2293.
38	TEXTILES	74.	38	SERVICES	-2664.
39	HOLDING COMPANIES	72.	39	INSURANCE	-2707.
40	PLAST-GLASS PRODUCTS	48.	40	SHIP, AIR CARGO	-2727.
41	PETROLEUM	-592.	41	PRINTING	-3050.
42	CHEMICALS	-1042.	42	LEGAL SERVICES	-3156.
43	WOOD PROD.	-1105.	43	FOOD PROC.	-3409.
44	PAPER PRODUCTS	-1251.	44	ELECT MACHINERY	-4931.
45	INSURANCE	-1402.	45	FAB. METALS	-4992.
46	PASS. TRANSPORTATION	-2043.	46	TRADE CONTRACTORS	-5677.
47	LEGAL SERVICES	-3213.	47	MACHINERY /NO ELECT	-6003.
48	FAB. METALS	-4154.	48	FED. GOV.	-7432.
49	TRADE CONTRACTORS	-5018.	49	ALL CONSTRUCTION	-8019.
50	BLD. CONSTRUCTION	-5140.	50	WHOLESALE	-10204.
51	FED. GOV.	-5170.	51	RETAIL	-10568.
52	ALL CONSTRUCTION	-10587.	52	STAT-LOCAL GOVT.	-12683.
53	ALL GOVT.	-21478.	53	ALL GOVT.	-25889.
54	STAT-LOCAL GOVT.	-86197.	54	ALL MANUF.	-26396.
55	MINING	*****	55	MINING	*****

¹The score represents the competitive shift in percent multiplied by the 1965 sector employment.

Source: U.S. Department of Commerce, Bureau of Economic Analysis and McDonald & Grefe, Inc.

Table IV-7

EMPLOYMENT BY INDUSTRY GROUP
SAN FRANCISCO-OAKLAND SMSA
1965 - 1973

SECTOR DESCRIPTION	1965 EMPLOYMENT	1973 EMPLOYMENT	*	SECTOR DESCRIPTION	1965 EMPLOYMENT	1973 EMPLOYMENT
1 AGRIC. SER	2307.	3470.	*	34 REAL ESTAT	14006.	22068.
2 MINING	N/A	N/A	*	35 HOLDING CO	1546.	2529.
3 ALL CONSTR	64275.	56784.	*	36 ALL FINANC	79876.	110255.
4 BLD. CONST	19242.	18097.	*	37 HOTELS	13741.	17657.
5 TRAFIC CONST	31339.	26152.	*	38 BUS. SERV.	25657.	48034.
6 ALL MANUF.	192396.	192256.	*	39 PERS. SERV	27090.	27894.
7 FOOD PROD.	29106.	23776.	*	40 ENTERTAINM	11018.	14342.
8 TEXTILES	668.	779.	*	41 HEALTH SER	32759.	56542.
9 APPAREL	8094.	11218.	*	42 LEGAL SERV	6757.	7789.
10 WOOD PROD.	6500.	5887.	*	43 EDUC. SERV	6757.	15141.
11 PRINTING	19481.	19227.	*	44 NONPROFIT	16181.	24427.
12 CHEMICALS	11630.	12069.	*	45 MISC. SERV	11596.	18919.
13 MACHINERY	12530.	14938.	*	46 SERVICES	154354.	229900.
14 ELECT MACH	15452.	17069.	*	47 CONST. AUX	341.	1872.
15 TRAN EQUIP	13546.	13801.	*	48 MANUF. AUX	9191.	21090.
16 PAPER PROD	9269.	7467.	*	49 TRANS. AUX	767.	1650.
17 PETROLEUM	5726.	4435.	*	50 FINAN. AUX	109.	659.
18 PLAST-GLAS	9792.	10119.	*	51 SERVIC AUX	742.	1563.
19 PRIM METAL	11852.	12069.	*	52 TOTAL EMPL	921137.	995907.
20 FAB. METAL	19449.	18681.	*	53 AGRICULT.	2218.	3397.
21 INSTRUMENT	2499.	2840.	*	54 FORESTRY	N/A	N/A
22 MISC. MANU	3214.	4265.	*	55 MINING SUB	1124.	978.
23 ALL TRANSP	89489.	114769.	*	56 OTHER CONS	14043.	14217.
24 PASS. TRAN	9357.	9407.	*	57 MUSEUMS	8.	286.
25 SHIP, AIR	25279.	35804.	*	58 RETAIL SUP	N/A	N/A
26 TRANS SERV	3070.	5128.	*	59 MINING AUX	881.	57.
27 OTHER TRAN	17274.	18927.	*	60 WHOLE. AUX	N/A	N/A
28 COMMUN.	21708.	28588.	*	61 RETAIL AUX	N/A	N/A
29 WHOLESALE	78678.	86712.	*	62 UNCLASS.	N/A	N/A
30 RETAIL	155427.	196947.	*	63 UTILITIES	11889.	15172.
31 BANKING	28759.	43949.	*	64 FED. GOV.	68300.	70700.
32 SECURITIES	3696.	5895.	*	65 STAT-LOCAL	152500.	206200.
33 INSURANCE	31761.	35052.	*	66 ALL GOVT.	221200.	276500.

Source: U.S. Department of Commerce, Bureau of
Economic Analysis and McDonald & Grefe, Inc.

a causal mechanism. In order to isolate a BART impact from this conclusion, an interview program was undertaken to explain the reasons, or causal mechanisms, for these exceptional growth patterns. Were these competitive shifts due to the attractiveness of the Bay Area and West Coast generally, or did BART's anticipated service contribute to the attractiveness?

The impacts of BART itself could only be determined by questioning decisionmakers and informed officials as to how BART may have affected their location decisions or operations. Case studies were written to document the findings in those industries where impacts seemed most likely to occur.

1. Interview Program

A total of 85 interviews with Bay Area business and industry leaders were held to confirm or refute the relationship between BART's service and the observed shifts in the structure of the Bay Area economy. The interviewees were selected in part on the basis of the employment analysis and in part on the bases of judgment and a priori reasoning.

Interviewees were classified into two groups. One group is comprised of key informants knowledgeable about the overall performance of the Bay Area economy -- particularly location decisions -- because of their roles in finance, real estate, industrial park development and transportation systems. This group was interviewed to gain insight into possible impacts. The second group was comprised of experts in specific economic sectors. A list of the interviewees is contained in Appendix C.

The interviewing program focused on BART's potential impact on the competitive advantage or operational efficiencies of central administrative and professional offices, the government sector, services, finance and manufacturing. Key-informant interviews also sought to identify potential BART impacts on other industrial sectors which might not have emerged from the employment analysis.

The interview program was designed to gather information or evidence that would lead to the acceptance or rejection of a number of preconstructed hypotheses regarding BART or its impact on commerce and employment in the Bay Area, in order to determine impacts which would not result from the NBA. In addition, it served to develop a data base from which relevant case-study targets could be selected for further analysis.

Evidence which would allow acceptance of any of the following four positive hypotheses would verify a BART impact.

- BART service constitutes a significant, although subjective, consideration in the regional location decisions of public sector agencies, and commercial and industrial firms, such that the competitive position of the Bay Area is enhanced.
- BART is a significant factor contributing to the ability of the Bay Area to attract highly skilled technical and management personnel.
- BART service contributed to the production of a net increase in operating efficiency in the sectors interviewed.¹
- BART service contributed to increasing sales and income in the region and thus the growth of the Bay Area economy.

The interviewing program results overwhelmingly supported these conclusions:

- There was no locational advantage for the BART service area compared to other areas in the Bay region, or other regions, because of the existence of BART. There were no instances where BART service could be cited as a significant or causal reason for a locational decision from outside the Bay Area.
- There were no instances cited where BART provided a significant efficiency of operation for an existing business. BART usage is a convenience in many instances, but no case was identified in which the availability of BART service would have a measurable effect on productivity or operating profits.
- There was no indication that BART in any way affected demand for the products of the Bay Area's export-base industries --including the tourism industry.

These findings emerged from an extensive structured interview program. The program was formulated to narrow the investigation, successively, from broad potential impacts to very specific industry or firm examples.

The directed interviews -- 60 interviews with representatives of sectors in which impacts might have occurred -- provided

¹The term "increase in operating efficiency" is used to denote a situation where an individual production unit (e.g., government office, factory) produces the same output using a reduced input of any factor (or additional output using the same inputs.)

little further support for the existence of any BART impact on the research hypotheses.

Land developers considered BART inconsequential to interregional location decisions, although it provided an enhancement of the region's image.¹ This observation was reinforced by interviews with executive search firms.

Health services officials believed BART may have improved efficiency by facilitating interoffice travel. Representatives of the legal profession minimized that impact and expressed reluctance to depend on BART's reliability. Banking institutions considered it to be faster, possibly, in processing interbank communication. Manufacturing concerns expressed little effect on their interregional location decisions, the availability of the work force, or the competitive advantage of the region.

BART has not been viewed as a significant factor in attracting either tourism or convention business.

2. Case Study Findings on Transportation Service Impacts

Despite the research results which, to this point, reflected no significant BART impact on the efficiency or competitive advantage of business within the region, four case studies were developed to explore further the possible impacts on activities likely to have been affected. These case studies attempted an in-depth identification of impacts that might have been overlooked in an analysis of gross employment data or more general interviews. The case studies focused on activity in four sectors, three of which emerged as unusual growth sectors in the shift/share analysis: central office activity, health service delivery, finance and public administration.

The first case study involved the headquarters operations of the Clorox Company, a long-time Bay Area manufacturer of household products, which has its headquarters office function in Oakland City Center -- a location with excellent access to the BART system. Selection of this case study most decidedly did not involve any "randomization." To the contrary, the conjecture was that if there are efficiencies of operation for headquarters functions to be found anywhere in the Bay

¹As noted previously, intraregional locational decisions were not the subject of the research project, but are being studied in the Land Use and Urban Development Project.

Area that can be attributed to BART, they would exist in this case.¹

The conclusion was that access to BART was not key to the location decision of the company, although use of BART for business purposes is regarded as a convenience.

One impact of BART on this particular headquarters operation must be considered. It was clear from the interviews with Clorox Company representatives and from review of the firm's overall public relations program that BART is used to enhance the "image" of the organization, even though there is no evidence that the BART service was instrumental in the location decision. For example, BART's trains and the convenient access to BART service at the Oakland City Center project were prominently displayed in the firm's 1976 Annual Report.

The second case study considered the Kaiser Foundation medical services as an economic sector. This analysis complemented the consideration given to Kaiser when the impact of BART on institutions was considered,² and dealt with medical service delivery as an economic activity with demand, supply and production functions not markedly dissimilar to any other enterprise. The Kaiser case study, much as the headquarters office case study, was deliberately selected because of a priori indications that a BART impact might be identified.

The conclusions from the Kaiser Foundation case study reinforced the previous case study: BART is a convenience. In this case study, however, it is also used in the course of Kaiser's business operations. A limited number of Kaiser's patients utilize BART to take advantage of Kaiser services but there is every indication that the same transit-dependent group would use the No-BART Alternative. There is some interest in the future ability of BART to improve travel between the Kaiser headquarters in Oakland and the major facility in Sacramento, when a BART-AMTRAK interchange will provide a direct connection between Sacramento and Kaiser headquarters near BART's MacArthur

¹The scope of that statement must be interpreted with caution. In fact, the City Center project itself has been identified in the BART Impact Program Environment Project as a "BART impact." This project's feasibility was closely linked to the opportunity to use the investment in the City Center Station as the matching local share for a federally financed urban renewal project.

²Jefferson Associates, Inc., "Impacts of BART on Bay Area Health Institutions," a technical memorandum prepared for the Metropolitan Transportation Commission, March 1977.

Boulevard station in Oakland. There is no indication, however, that BART currently has had any impact on economic efficiency.

The branch banking operation of California Savings & Loan Company was selected as the third case study. This moderately-sized Bay Area savings and loan institution has four of its five branches located in or near a BART station.

One BART impact on this institution was the testing of technological innovation. The innovation was a remote teller within the Powell Street BART Station, which permitted BART patrons to transact business from the station. Market potential for the remote teller facility had been carefully researched, using experience from transit stations in New York and Philadelphia, but the results have been disappointing. One of the most frequent transactions is a request for change for a twenty-dollar bill, since BART's automatic change equipment will accept only denominations of ten dollars and less.

Instances of BART usage for business communication -- interbank transfers -- were noted, but this use was by no means significant to a location decision, nor could its effects be interpreted as influencing the efficiency of bank operations.

The fourth case study involved the impact of BART on a true Bay Area growth sector, government and public services. The operations and location decisions of three separate public agencies were reviewed: the U. S. Energy Research and Development Administration (ERDA), the U. S. Social Security Administration (SSA) and a field office of the Federal Bureau of Investigation (FBI).

ERDA's regional headquarters is located in San Francisco and an administrative center is located in Oakland's City Center project. It was clear from the interviews and case study research that ERDA's decision to locate in Oakland had been influenced by BART, but the impacts on efficiency or improved ability to recruit employees were inconsequential. BART is used by senior agency officials who are attending meetings in the San Francisco regional headquarters, but this is a convenience, rather than a significant operating efficiency. Similarly, the location near BART was not found to facilitate the journey to work.

The Social Security Administration was a particularly interesting case study in that, for a time, BART provided direct Daly City-Richmond service twice a day, what might have been deemed a Social Security Administration impact on BART. This service was known as the "Social Security Special" and was

designed to provide direct access to the Social Security Administration offices by its employees -- particularly transit-dependent employees -- when the offices moved from San Francisco to Richmond. In fact, the case study indicated that BART's reliability problems discouraged its use. There was even some suggestion that BART service became a convenient explanation for tardiness. In any case, quantitative indications point to a decline in productivity after the move to Richmond, and in no case could there be found an advantage that could be attributed to BART.

The final example -- the FBI field office in Berkeley -- runs counter to the conclusions from all the other case studies. First, the use of BART for the journey to work is significant: one-third of the agents take BART regularly. But there are only six agents. The FBI case study also provided the first example of a BART impact on operating efficiencies. The local FBI office has been able to dispense with one of its six staff cars because the agents could use BART in carrying out their daily responsibilities. This represented the only identified efficiency of BART transportation service in the case studies.

3. BART Service Impacts on Headquarters Office Activity: A Case Study of the Clorox Company

In 1972, the San Francisco-Oakland standard metropolitan statistical area (SMSA) was ranked tenth among the nation's headquarters SMSAs in total employment in central-administrative offices of auxiliary activity. These activities represent management of professional functions performed centrally for large multioffice companies.

The employment analysis identified the BART service area as offering a competitive advantage for central-office activities. The interview results also indicated that "headquarters" activities may have benefited from efficiencies available through BART service.

This case study illustrates the economic considerations and constraints and helps to determine whether BART service was responsible for any growth that would not have occurred in the absence of BART. While it is recognized that individual corporate needs and circumstances vary quite widely among firms, the methodology employed was designed to first identify and confirm BART impacts and then estimate their regionwide economic significance.

The office building containing the world headquarters of the Clorox Company, at 1221 Broadway Avenue in the Oakland City Center redevelopment area, has direct access to the City Center

BART station from the Plaza level. This location is central to a large concentration of Bay Area minority labor and enjoys access to all communities served by BART without requiring a transfer enroute. If labor force accessibility advantages are a BART impact, the Clorox case study offered an excellent opportunity to test for them.

Secondly, the access to Bay Area agglomerations of financial and business service activities upon which headquarters operations are typically so dependent appeared to have been strengthened by direct trans-Bay BART service between the business districts of Oakland and San Francisco. If an impact of BART were an increase in the supply of potential headquarter locations by improving accessibility between and among business service agglomerations, the Clorox case would offer an example.

By either confirming or refuting the existence of BART impacts in the Clorox situation, conclusions could be drawn concerning the nature of these impacts.

Third, the futuristic or "space age" appearance of the BART system had been cited as being beneficial to the development of their communities and organizations. Oakland City Center Redevelopment Project representatives and tenants, including Clorox, were very enthusiastic about the image created by BART. Impressions of top-level Clorox management were requested, in an effort to relate this potential BART impact to location decisions. Even identifying a BART impact on central-office activity is difficult, since the impact in competitive advantage or efficiency is so elusive of measurement. Productivity measures for nonstandard decisions and activities are difficult to achieve. Therefore, the impacts will be equally elusive.

"If these activities have a common characteristic that is locationally significant, it is probably their preoccupation with a flow of facts and figures - with the collection, processing or distribution of information and the making of administrative decisions. The establishments providing these services are not located in response to a critical pressure of transport costs or costs of unskilled labor. Rather, their chief locational needs appear to be quick and convenient personal relations with those whose knowledge, advice, expert performance, or decisions are essential to efficient operations."¹

¹Lichtenberg, Robert M., One-Tenth of a Nation, Cambridge, Harvard University Press, 1960, p. 153.

Much of the work carried out in central-office establishments requires face-to-face contact, not only in securing needed information, but in facilitating consensus on complex issues. These subjective elements are not usually entrusted to the telephone or correspondence.

In functional terms, the executive elite is concerned with minimizing the level of uncertainty associated with each decision. The organization's technical and mid-level management staff often serve two functions in this respect. First, they advise top-level management concerning matters for which they possess expertise, such as in law, advertising or accounting (Central Administrative Office). Secondly, they act as a conduit to the more specialized professionals, whose expertise is shared among the business community (auxiliaries). Agglomerations of specialized expertise tend to develop in and around headquarters to facilitate this process.

If a transportation improvement like BART facilitates greater mobility for the providers of management and business-related services, then an increased level of output from a given level of resources may result. The questions put to Clorox officials were designed to indicate the extent to which operational efficiencies (in the conduct of their affairs) could be directly related to BART service. The new Clorox location in downtown Oakland is ideal for taking advantage of any increased levels of operating efficiency, labor force accessibility or image enhancement which BART may provide.

a. Employment Accessibility

One of the greatest locational needs of a central office is access to a large supply of office workers and professionals. Oakland BART service offers direct access to and from all BART line communities, without requiring a transfer to a different line to complete the trip. Over 90 percent of Clorox's employees reside in the East Bay, primarily in the Richmond, San Leandro and Hayward areas. A recent survey conducted by Clorox management revealed that of the 344 employees (out of a total of 480) surveyed, 80 percent used public transportation for their work-to-residence journeys at least some of the time, and 58 percent of those public transit users used BART some of the time. Of the 58 percent who reported using BART some of the time, 70 percent reported that they ride BART to and from work at least 95 percent of the time.

The interviews investigated employee usage of BART as it affects employee productivity at Clorox. One measure sought for its BART-related significance was data on absenteeism. Personnel officials indicated that the absentee rate seems to be

leveling off, since Clorox moved to the downtown location, but is not significantly below the average at the previous location. To what extent this minor decrease is attributable to BART service availability cannot be determined with any acceptable confidence level. The decrease, albeit minor, does coincide with an increase in employee choice between alternative transport modes which now include BART.

Clorox officials pointed out that the clerical employee turnover rate following the move to their downtown location was much higher than they had experienced in a previous move from Hegenberger Road to Oakport Drive in 1969. A large segment of the Clorox work force resides in the San Leandro and Hayward area. The move in April 1976 seven miles north to downtown Oakland from Oakport Drive may have increased the commute distance excessively for some.

According to a recent study, the average Bay Area commuter lives 15.8 miles from his job; by comparison, Los Angeles commuters are only 8.9 miles away, Chicago commuters 6.6 miles and Philadelphia commuters 4.4 miles.¹ Choice among transport modes would seem important for distances traveled by Bay Area commuters and as a contingency in reducing absenteeism in those cases where regular transport has failed.

In coordination with Clorox Company personnel officials, BART sales representatives instituted a pilot program designed to further encourage BART usage. BART tickets were offered for sale at the Clorox personnel office in ten and twenty-dollar denominations at a 10 percent discount.

This program, originally planned for a two-month period, was extended to four months and was, in the opinion of one Clorox personnel official, very successful.

When first approached about the relationship BART held in the central office operation, Clorox was adamant about the improved labor force accessibility advantages which BART offered. Yet, their personnel office reports no significant change in the ability to attract qualified persons to fill the available positions which resulted from the move to downtown Oakland. Job specifications have remained largely the same as before the

¹Webber, Melvin M., The BART Experience - What Have We Learned? Institute for Urban and Regional Studies and Institute of Transit Studies, Berkeley, University of California, Monograph No. 26, p. 176.

move and personnel officials report no qualitative change in the type of employee filling these new positions.

Overall, changes in worker productivity at Clorox headquarters attributable to BART have not been a result of the new location. How important has BART been then, in facilitating more efficient central-office operations?

b. Potential Efficiency Impacts

Currently, approximately 480 employees are assigned to the Clorox headquarters. About 100, or slightly more than 20 percent, are involved directly in the decision and policymaking affairs of the organization. These are the individuals who require face-to-face interaction with highly skilled experts most frequently. While leading executives indicated that they do, on occasion, use BART in the conduct of their interactions with outside experts, they did not feel that any measurable gains in their ability to assemble information or make personal contact had resulted from the availability of BART service. The Clorox organization makes extensive use of independent legal and accounting professionals maintaining offices both in Oakland and in downtown San Francisco. Although BART is often used to facilitate meetings, it was not cited as a stimulus to more frequent or less costly communications.

Some executives have reported using BART for trips to San Francisco for luncheons or meetings. When asked if this use of public transportation for business-related purposes would have still occurred if improved bus transit were employed to provide the same level of service provided by BART, the response of Clorox executives was that they would sooner drive than take a bus. BART provides a more dignified method of transport in the opinion of Clorox officials. Since business-related travel for the headquarters executives so often takes place at off-peak hours of highway usage, automobiles are frequently more convenient. This phenomenon of potential business use of rapid transit, but not of bus, would exemplify the rhetoric of BART justification.

The Clorox executive's responses were consistent with findings from interviews with members of the business service community. As in the Clorox case, BART tended to complement business service activity by providing an additional convenience for business travel, although no measurable increase in efficiency resulted.

As one Clorox official put it, "We are in the position where most outside consultants come to us, rather than us having to visit them. And therefore, our transport needs are somewhat reduced in that respect."

The Clorox headquarters in Oakland seems to conform in many respects to a typical headquarters operation in terms of its need to be located in a metropolitan center, and the advantages it derives from BART service in the conduct of its operations are minimal. The external economies of business service agglomeration in the San Francisco-Oakland SMSA do not appear to have been significantly enhanced as a result of BART service.

Although BART is used to facilitate meetings between managers and those with whom they conduct their affairs, BART's effect on business operations is not substantial. BART seems to be used when time constraints are minimal or as a change of pace, but not as a regular means of intraregional transportation in the course of business.

c. Image Enhancement of BART's Impact

One element which must not be overlooked is the prestige or image enhancement quality afforded an organization that locates facilities in a community served by BART. While this is, at best, difficult to measure, it nevertheless is a consideration in choosing a headquarters facility. Some addresses hold more prestige than others and may serve to differentiate one firm from the next (if not to those who purchase its products, perhaps to those who purchase its stock). The 1976 Clorox Company Annual Report speaks highly of Oakland's attributes and proudly displays artists' sketches of Clorox employees entering its new highrise headquarters as they step from a blue-and-silver BART car.

The planned 500-room hotel at Oakland City Center, with parking, shopping, entertainment and restaurant facilities is mentioned in addition to other planned and existing amenities, with which only the most successful corporations surround themselves. The benefits that Clorox will be able to derive from promoting the prestige of its location are, of course, not possible to estimate. What is important to note is that Clorox is claiming a measure of prestige by virtue of its location near BART service. That this prestige element associated with BART will be sufficient to induce other organizations to select the Bay Area as a headquarters location is not a compelling BART impact.

d. Corporate Location Decision

The importance of BART service as a factor in corporate location decisions is best understood in the context in which the Clorox relocation decision was made. Given a recent history of rapid growth at Clorox, top-level managers were concerned about selecting a location that would easily accommodate its future space needs.

The City Center relocation was to be the second headquarters move in seven years and management was determined to select a more permanent site. For none other than historical reasons (the company was founded in Oakland in 1913) the decision was made to remain in Alameda County to retain Clorox's Bay Area ties. By selecting City Center, a number of advantages were gained, aside from its excellent freeway, public transit and central location access.

The site would provide more than adequate space for conducting its affairs in the tallest building in Oakland, which would bear its name (The Clorox Building) and provide effectively unlimited expansion potential during the coming years. The company leased eight of the 24 floors in the building, with options to expand its usage as needed upon renewal of its lease.

While the exact terms of the Clorox lease were not disclosed, it was reported by the building leasing agent that Clorox is paying \$0.75 per square foot per month for its fully serviced office space. Comparable new office space in Oakland is typically leased at about \$0.95 per square foot per month. In fact, the cost of space would itself diminish the importance of BART to the corporate location decision. If the cost of space at the BART station is below market (which may or may not be the reason for Clorox's lease terms), there would appear to be little market demand for any presumed competitive advantages inherent in rapid transit service access.

e. BART Impacts on Locational Decisions for Headquarters Offices

Given that BART serves only a small portion of the total transportation demand of the Bay Area, its direct impacts on headquarters functions, as exemplified by the Clorox case, are minimal. It appears that some small degree of convenience may result for Bay Area business located near BART stations enabling an easier sharing of the agglomeration of business and professional services. These conveniences do not, however, translate into efficiencies that can be measured in terms of increased output per measured input.

No organization studied was found to have required any additional amount of office space in the Bay Area due to efficiencies related to BART. Further, no firm or organization felt that a firm like theirs would be attracted to the Bay Area because of available BART services.

Whatever the attributes that serve to set the Bay Area apart from other SMSAs as a headquarters center for the State and nation, they do not include BART as a primary component. This

is, of course, not to say that transportation access is an unimportant locational variable; rather, BART-specific transportation is not of major significance among all those factors considered.

The analysis does indicate that BART may have resulted in significant intraregional impacts in the final location and specification of new development. The Land Use and Urban Development Project efforts will shed more light on the dimensions of these impacts. Over the longer term, these intraurban impacts may hold significance in the cause and extent of Bay Area economic growth in jobs and income. An efficient spatial organization of economic activity can be important in generating economic growth from existing resources, as well as in attracting additional human and investment capital to the region.

4. BART Service Impacts on Health Care Delivery: A Case Study of the Kaiser Foundation Medical Care Program

In interviews with representatives of commerce, industry and public administration in the Bay Area, the question was asked, which industrial sectors were the most likely to have been impacted by the construction and operating of the BART system. The personal services sector was cited most often and health care was specifically mentioned a number of times. Analysis of employment growth in the Bay Area (comparing Bay Area employment with that of 15 headquarters SMSAs in the United States) showed the health services industry to rank among the industrial sectors experiencing exceptional employment growth between 1965 and 1973.

These indications led to further investigation of the relationship between the observed growth in health care employment and the operation of BART. Directed interviews with representatives of the Kaiser Foundation Medical Care Program in Oakland revealed potential BART-related transportation advantages in the delivery of health care services.

The Kaiser Foundation operates 15 medical offices and hospitals throughout the nine-county Bay Area, providing care to over 20 percent of the area's civilian nonindigent population. The current Bay Area Kaiser membership is about 1.3 million.

The Kaiser Foundation operation was chosen as a case study subject because all Kaiser medical centers and medical offices are

¹See Appendix C for the list of interviewees.

²Kaiser-Permanente Health Plan, "1976 Annual Statistical Review", Department of Medical Economics, April 1977, Table 1.

located in close proximity to a major freeway, expressway or public transportation corridor. The centers in Oakland, Walnut Creek, Richmond, Hayward and a center soon to be developed in Fremont are all accessible by BART. This characteristic indicates a consistently strong demand for both local and regional transportation access. If the difference between BART and the NBA scenarios results in significant impacts on the delivery of health care in the Bay Area, a case study of the unified Kaiser system offers the best possibility for documentation of such effects.

While the development of a regional transportation system tends to complement the Kaiser form of health care delivery, it has not resulted in any measurable gains in the effectiveness or efficiency with which health care resources have been allocated by Kaiser; nor is the increase in the final effective demand for health care, faced by Kaiser or other providers, due to the transportation services that BART provides. For this to have occurred, BART service would have had to result in a measurable cost differentiation from that of the NBA, flowing either to consumers or producers of health care.

A centralized health care program, like Kaiser's, locates its medical centers where the out-of-pocket transportation costs of its members will be minimized when obtaining medical care. The Kaiser service area in the northern California region is defined by a 30-mile radius from each of its medical centers. Locations which afford the maximum access via public and private transportation could provide Kaiser with a competitive advantage.

This cost advantage (assuming that the health care which Kaiser provides is equal to that which is made available by other producers) may result in an increase in the demand for Kaiser services. Either Kaiser members will consume more health care or more members will be attracted to the Kaiser plan away from other providers. This transportation accessibility advantage could result in an economic efficiency that would give rise to greater consumption at the same price level. It could also yield efficiency improvements for Kaiser, if BART service actually improved productivity through facilitating communication among facilities.

To determine the extent of BART's impact on the form, functions and level of health care services provided by Kaiser, data were assembled and analyzed. Interviews were conducted with management officials and technical experts at the Kaiser Foundation.

a. Market Accessibility

First, the role of BART for the consumers of health care was examined to determine whether transport-related efficiencies

stemming from BART operations had resulted in additional increments of effective demand. Short of this conclusion, we sought to identify and measure any reduction in the out-of-pocket expenses incurred by Kaiser members as a result of BART service availability that the NBA would not have made available.

Kaiser-member BART usage was surveyed¹ at the Kaiser-Permanente Medical Center in Walnut Creek and the Kaiser-Permanente Hospital in Oakland. Of 159 outpatients surveyed at the Walnut Creek facility, approximately one-half² had traveled from BART-served communities. Only one had used BART for the trip; other respondents cited the difficulty of reaching BART from residential areas except by car as a reason for not taking BART to the Medical Center.

The survey concluded that "respondents do not perceive BART as offering a real alternative to the automobile." The findings suggest that "BART has had almost no impact on Walnut Creek Kaiser patients' mobility to health care" and "does not appear to enhance transportation-dependent respondents' accessibility to the facility."³

One-fourth of the 167 patients surveyed at the Oakland facility had traveled from communities served by BART; none had used BART for the journey. Staff members at the hospital stated that the feeder-bus service was irregular, making a BART-plus-bus trip an unreliable commute mode.⁴

The researchers wrote, "It is noteworthy in the context of minimal BART impacts...that BART is consistently acknowledged by respondents to have been available to them for travel to the health care institution...respondents' lack of BART use thus does not,⁵ apparently stem from ignorance of BART availability or routes." The conclusion was that "in all cases, BART use was extremely low, and this finding generally cut across socioeconomic and local site factors."⁶

¹ Jefferson Associates, "Impacts of the BART System on Health Care Institutions", a technical memorandum prepared for the Institutions and Life Styles Project for Metropolitan Transportation Commission, November 17, 1976, p. 78.

² Ibid., Fig. 1, p. 6.

³ Ibid., p. 23.

⁴ Ibid., Fig. 5, p. 12.

⁵ Ibid., p. 32.

⁶ Ibid., p. 37.

While all Kaiser management personnel agreed that BART use by members was quite low, one hospital administrator at the Walnut Creek Kaiser Medical Center ventured a conjecture based on his experience. Due to the heavy utilization of plant, equipment and personnel at the Walnut Creek Center (about 3,500 medical interactions per day), patients must arrive at least 15 minutes ahead of their scheduled appointments. Tardiness usually results in the patient being rescheduled for another appointment on another day.

b. Potential Business Efficiency

Interviews with Kaiser officials also indicated that BART service was indeed being used in the course of conducting the health care program activities. For example, occasionally messengers are sent with blood supplies or pharmaceuticals between the Oakland and Walnut Creek medical centers. Additionally, hospital administrative staff based in Sacramento ride BART to Kaiser headquarters in Oakland by driving first to Concord and boarding BART for the final leg of this journey. The reason given for the use of BART by those traveling from Sacramento to Concord and taking BART to Oakland was that it served to break up the monotony of a long drive from Sacramento and not that it saved time or avoided congestion.

It was reported that BART usage by Kaiser staff would probably increase somewhat as additional facilities are developed along the BART lines. Presently, plans are being finalized for redevelopment of an existing facility in Richmond and development of a new facility in Fremont. Land has been acquired adjacent to BART stations in both communities.

Yet, in spite of these encouraging indications, the actual magnitude of BART usage turned out to be quite small. Estimates of between 15 and 20 person-trips per month are made by Bay Area Kaiser management for staff meetings usually held in the downtown Oakland Kaiser headquarters.

BART is used on occasion for delivering blood or medical supplies, but these trips are not a result of Kaiser policies encouraging BART as a means of transport. BART in this respect serves as a contingency when Kaiser vehicles are in use elsewhere. Kaiser executives, however, indicated that BART has had no effect on the size of the corporate vehicle fleet, nor on Kaiser's ability to effect adequate distribution among its medical centers. It would appear that no cost savings are being realized which result in the production of measurable net efficiencies of operations.

c. Labor Force Accessibility

Kaiser employs approximately 9,600 persons, exclusive of physicians and nurse practitioners, throughout the Bay Area.

Its labor force has been growing at a rate of about five percent per year during the past three years and is expected to continue this growth rate for approximately the next five years.

Personnel managers reported no change in their ability to hire qualified persons for positions at any skill level since BART began operations. Their experience has been that an excess of health care and clerical workers has been available in the Bay Area. Further, the location criteria used in selecting medical center sites ensures adequate access for members and workers as well.

Kaiser-affiliated physicians are reported to be infrequent users of BART or other public transit systems. Parking facilities are maintained separately for them at most hospitals. The uniqueness of the Kaiser Program is considered the major inducement for affiliation with Kaiser and subsequent relocation to the Bay Area, while the overall local and regional amenities, including BART, are considered secondary factors. Physicians are recruited nationally.

d. Impact on Facility Planning

Kaiser medical centers are designed and constructed to provide the full range of services demanded by the size and demographics of each community they serve, although some specialization among centers exists. The Richmond center, when fully redeveloped, will provide the bulk of the Kaiser systems' psychiatric care and the Hayward center will specialize in neurological care. Further specialization results from demographic variation among communities; San Francisco is characterized by an aging population and therefore is more extensively equipped to handle geriatric care, while Hayward's population contains a large concentration of young families and, hence, requires a greater facility for pediatrics.

Kaiser facilities in the Bay Area are in many instances serving a dual function. They are local centers for the distribution of general care and regional centers for the distribution of more specialized care. The transportation implications of such a delivery system are considerable. Twelve of the Kaiser medical centers are located less than one mile from a major freeway or expressway, and all are served by some form of public transit.

On balance, BART service has been a considered factor in the final design and/or locational specifications of planned Kaiser Foundation medical facilities, but only in conjunction with the availability of good freeway access. Kaiser planners indicated

that, had an alternative to BART been available providing equal levels of service, development and planning of these facilities would not have been effected differently. Regardless of BART or the NBA, Richmond would still have been the preferred location for a regional psychiatric center. Further, a site in Fremont would inevitably have been selected to accommodate growth in Kaiser South Bay membership. The operation of BART service has had no impact on the timing of such development, according to Kaiser, nor did analysis of their operations or trends in the health care industry bear out such a hypothesis.

As suggested by BART usage surveys by trip purpose and the responses of Kaiser officials, member usage of BART has been quite low. But planners and administrators of the Kaiser system were optimistic about the potential for BART use, particularly at the Richmond center. Even when developed to full operation capacity, the Richmond facility will accommodate less than half the number of medical interactions per day experienced at other centers.

In selecting an appropriate location for a regional psychiatric center, Kaiser planners initially determined the Richmond community to be most favorable, given its proximity to all Bay Area and Sacramento members. Two possible locations were available, a 15-acre site somewhat removed from the population center on U. S. Route 80 (now occupied by the Hilltop Shopping Center), and a five-acre site in the downtown Richmond redevelopment project. Kaiser was already operating a clinic near the downtown property which serves the immediate community. Rather than undergo a complete relocation, it was felt that the dual criteria of maximizing local and regional accessibility would be best served by expanding the existing downtown clinic to accommodate the regional needs for psychiatric care, in addition to maintaining the current level of service.

By developing the downtown clinic approximately one mile from U. S. Route 80, some Sacramento and Bay Area accessibility will be sacrificed. These losses are likely to be mitigated somewhat by other factors. First, local population accessibility may be greater at the downtown location. Secondly, State Route 17, linking the Richmond Bridge to U. S. Route 80, has been designated for improvement to freeway status. This improvement would result in freeway access to downtown Richmond. Third, the redeveloped Kaiser Center will be within one-eighth of a mile from the Richmond BART station, providing additional regional access.

In addition to the Richmond site redevelopment, Kaiser also is developing plans for the construction of a full-scale medical center in Fremont on a 25-acre site purchased in 1971, adjacent

to BART service. Fremont facility plans were not available, nor was a development schedule indicated. The availability of BART's regional service was cited as a consideration in the final decision to acquire the Fremont property. The actual development of the site will be determined by the local demand for health care which Kaiser can provide.

5. BART Service Impacts on Branch Banking: A Case Study of the California Savings and Loan Company

Analysis of employment growth in the Bay Area (comparing Bay Area employment growth with that of 15 headquarters SMSAs in the United States) showed the banking sector to rank 15th¹ among 34 industrial sectors experiencing a positive competitive shift in their levels of employment between 1965 and 1973. While this shift alone did not focus attention on banking as an industry impacted by BART, interviews with representatives from business and government in the Bay Area indicated a consensus that the personal service industrial sectors were most likely to have experienced an impact from BART service. To identify and measure, both quantitatively and qualitatively, any impacts of BART on the banking sector of the regional economy, California Savings and Loan Company was selected as a case study.

California Savings and Loan Company presently operates five branch offices in the Bay Area (four of which are located near BART stations) and is planning to develop another at the Terminal Shopping Center, adjacent to Concord's BART station. Two of the branches adjacent to BART (one at 16th and Mission Streets and another at 800 Market Street in San Francisco) were in operation for several years prior to the planning and construction of BART facilities. The headquarters offices of California Savings and Loan Company at 800 Market Street in San Francisco have direct access to the Powell Street BART station. An audiovisual remote teller device has been installed in that BART station, in an attempt to capture any market potential represented by BART passengers. The branches at the Lafayette and Bay Fair BART stations were opened after BART service commenced.

If impacts on the Bay Area's banking operations have resulted from BART service or activity around BART stations, California Savings and Loan Company offered an ideal opportunity to document and further analyze these impacts for their regional significance.

Transportation services per se do not appear to have been responsible for the kind of cost advantage to consumers that

¹See Table IV-1 for the results of the shift/share analysis.

generates increased effective demand for banking services or efficiencies for the banking institutions. Labor force accessibility advantages resulting from BART were not found to be significant due to the large supply of clerical workers dispersed throughout the Bay Area who are readily available to assume positions at suburban offices. Transit improvements may be important to the development of three primary variables which determine the suitability for a branch location: commercial density, residential density, and retail sales volume. The extent to which BART has altered the spatial distribution of these activities, however, will be a subject of the Land Use and Urban Development Project of the BART Impact Program.

From an aggregate regional standpoint, no evidence was found in this case study or the key informant and directed interview summary that established BART as a causal element in the observed growth of the banking industry in the Bay Area.

a. Market Consideration in Branch Bank Siting

Some discussion of the relevant considerations in selecting new branch bank locations will be useful in explaining the importance of regional transportation improvements for the banking industry. Although these considerations may vary in their relative importance with the overall circumstances of an institution, they do represent those variables most relevant to the site selection objectives.

The market area for branch banks in a metropolitan center is usually considered to be within a two-mile radius of the proposed site. Since people tend to prefer banking where they either work or shop, capture rates experienced by most branch banks are highest for locations close to employment and shopping centers. Existing or forecast values for three variables -- commercial density, volume of retail sales and residential density -- are usually evaluated to determine the feasibility of a potential site as a branch location. These factors are then considered in light of the actions likely to be taken by competitors in the market area. Maintenance of an institution's share of the market demand for banking services and available deposits is of primary importance in a branch development decision.

Much of the large corps of workers who occupy central-city offices find banking most convenient if done near where they work. Typically, shopping and banking activities are two land uses which help form central-place agglomerations.

The relationship between retail outlets and branch banks is complementary, since shopping and banking trips are often

conveniently combined. The volume of retail sales in combination with the density of commercial development serves as a good indicator of a location's potential for a branch bank.

Suburbanization has served to diminish the relative importance of central cities as branch banking centers while increasing their importance as headquarters locations. Banking has become a highly mechanized, centrally organized and diffuse operation. In recent years, drive-up, walk-up and other remote teller services have become popular, especially at suburban shopping locations and satellite communities. Generally, these facilities are located in response to levels of residential density in combination with actual or potential retail sales volume. An additional concern for savings and loan companies is the demographics of the suburban area. These institutions prefer population centers with older residents, since savings accumulations are apt to be greater among the elderly.

Market demand criteria notwithstanding, the actual or anticipated action of competitors is often the single most important factor in site location decisions. Savings and loan institutions often operate as oligopolists; the market in which they operate is characterized by a few institutions sharing the market for an essentially undifferentiated product or service. While most savings and loan institutions claim through advertising to be offering unique service, given state and federal banking regulations, the difference among the services of various institutions is quite small. The interest rates payable to depositors are set by regulatory agencies, and thus, price competition is not an available means of garnering additional market share. The result of this characteristic market structure is a tendency to compete intensely with others to maintain or increase their share of the available market.

This characteristic contributes to the high level of responsiveness shown by banks to development trends taking place in potential market areas. New commercial, residential or retail activity centers are often complemented by excess banking capacity prior to their full maturity, in order to ensure an initial position in areas that offer growth potential.

b. Potential Impacts on Operating Efficiencies

Branch banking, like other decentralized organizations, requires a network of communications and transportation facilities to accommodate its diverse functions. The use of BART service as a substitute for California Savings and Loan Company vehicles, resulting in a greater return per operating dollar, would have indicated the presence of an efficiency impact of BART service. BART was being used by California Savings and

Loan Company in the conduct of its activities, but these uses could not be confirmed as BART impacts, since public transit would have been used in the NBA scenario.

While it was found that BART is used on occasion to facilitate the delivery of urgently needed documents or supplies between the four California Savings and Loan Company branch offices located adjacent to the BART line, its reported level of usage was very low. Twice per month, a messenger from the headquarters office distributes payroll checks to the branches adjacent to BART stations, thus freeing a delivery van for other uses during that time. BART is also used on occasions when the delivery vehicle is elsewhere and a document must be delivered.

No measurable change has resulted in the use of the delivery vehicle because of BART availability. This delivery vehicle is used primarily for transporting bulky data processing materials between the branch offices. BART transportation as a substitute for this privately supplied input was insignificant.

c. BART Station as a Bank Site

A more visible attempt by California Savings and Loan Company to tap the market potential which they initially felt BART might stimulate is exemplified by an audiovisual remote teller system installed in the Powell Street BART station, below the headquarters offices. Similar efforts by bankers in New York and Philadelphia to operate walk-up window services in subway stations had proved only marginally successful. The audiovisual system was installed as a compromise to opening a BART station branch facility. The remote system consists of a television screen and sound equipment. Customer documents are placed in a canister and transported through a pneumatic tube to the operator's control area for disposition. Customer-teller contact is maintained at all times throughout the transaction.

The audiovisual system has not yet proved to be a successful enterprise. Although its operating costs are quite low (\$80 per year for servicing) and it can be operated by tellers on duty in the main branch office above the BART station, it barely justifies continuation. Typically, about eight inquiries a day are received from BART passengers for train schedule information or change for currency denominations too large to be accommodated by the BART ticket machines. The average of about two banking transactions per day during its one year of operation has placed in question the effectiveness of the \$100,000 audiovisual unit.

California Savings and Loan Company has experienced little change in the level of activity at two branch offices

established long before the planning and construction of BART, but now adjacent to its stations (at 800 Market Street and 16th and Mission Streets). The 16th and Mission office was reported by California Savings and Loan Company officers to have reached maturity several years ago and to have leveled off in its deposits. BART station activity has not resulted in any discernible change in terms of new accounts or volume of transactions. The same situation was reported for the office at 800 Market Street.

The three branches opened since the commencement of BART operation were selected for reasons unrelated to BART. The level of retail sales, in combination with commercial and residential density, were cited as the primary factors considered in the Bay Fair branch location decision. The Concord location was justified in the same way. The Lafayette branch was considered to have been located somewhat prematurely from a marketing standpoint, but was a necessary development, given the age level of the population and the actions of competing savings and loan institutions that had already located there. Including the manager, only three persons work at the Lafayette branch.

California Savings and Loan Company officials pointed out that the disruption created during the BART construction period would have, on balance, made the NBA a superior alternative. Any efficiencies in interbranch delivery could be as easily facilitated via express bus service.

It is not possible to conclude from a comparison of BART-adjacent and non-BART-adjacent branch banks that any increase in efficiency has been effected by BART.

d. Labor Force Accessibility

California Savings and Loan Company employs a total of 120 persons assigned throughout its headquarters and branch locations. Management officials report no change in their ability to attract qualified personnel for available positions. The clerical and entry-level management labor force in the Bay Area has been more than adequate to meet their needs for several years. Senior management positions are usually filled from within the organization, and openings occur quite infrequently, the last senior position having been filled five years ago.

It was reported that a slight reduction in the clerical staff turnover rate has occurred since BART operations began. These clerical positions are most commonly filled by single women. The most common reason for termination is marriage and relocation. Four instances occurred in which clerical employees were

able to continue working for California Savings and Loan Company after marriage and relocation, due to the expanded residential choice afforded by BART service. The benefit of these retentions was regarded as more important to the maintenance of morale than to labor productivity. In all of these instances, the availability of express bus service as an alternative to BART would have had the same result.

In the main, BART has had no effect on the accessibility of California Savings and Loan Company to a better potential work force. The company draws from a large pool of workers, usually located within a short distance of the branch bank.

6. BART Service Impacts on Public Administration

In a series of directed interviews with public administration representatives in the Bay Area, BART service was cited as a factor in the intraregional location decisions of three federal agencies. The most prominent reason cited for relocation near BART service was to improve accessibility to the office.

The U. S. Social Security Administration (SSA) selected a site in Richmond, and the U. S. Energy Research and Development Administration (ERDA) chose Oakland and San Francisco locations near BART stations with the intention of accommodating the commuting needs of their work forces. The Federal Bureau of Investigation (FBI) selected a location in Berkeley one block from its previous offices and adjacent to the Shattuck Avenue (Berkeley) BART station. The need for more office space prompted the move, but the requirement for a central city location and the convenience of BART for agents' commute trips resulted in the FBI's decision to remain in downtown Berkeley.

The public administration sector, in spite of its obvious attempts to increase labor force accessibility by locating its facilities near public transit routes, has realized only moderate success. Although ERDA and SSA selected their locations primarily on the basis of employee access to BART, the actual BART patronage by employees has been extremely low. BART's inability to meet the service needs of San Francisco residents -- since it represents primarily a regional line haul system -- was considered the greatest factor in reducing its impact on the accessibility to these employers. ERDA employees, for the most part, live in areas not served by BART and find driving easier, given the abundance of parking available in downtown Oakland. ERDA transit-dependent employees find AC Transit most convenient.

In no case was a public agency of the opinion that BART service enabled them to recruit qualified personnel from inside or outside the Bay Area more easily. As a necessary public service, the issue of image had no impact on its choice to locate within the Bay Area.

a. Social Security Administration

The Social Security Administration (SSA) selected a location near the Richmond BART station in an attempt to accommodate the commuting needs of its 1,850 employees. Approximately 750 of these employees reside in the San Francisco Area, where the previous SSA offices were located. It was expected that trans-Bay BART service would accommodate the San Francisco residents while shortening the travel distance of 1,110 East Bay workers, creating an overall improvement in worker accessibility.

The MacArthur Station transfer necessary to complete the trip from San Francisco to Richmond has proven a cumbersome barrier for the San Francisco commuters. Initially, arrangements were made with BART to operate a special train from Daly City directly to Richmond (called the Social Security Special), which was manually switched in Oakland, eliminating the need for a transfer. Due to commute-hour congestion, the only Richmond arrival times that could be arranged were at 7:00 AM and 9:00 AM, while the SSA's regular opening hour is 8:00 AM.

As a result, SSA officials report maximum BART patronage by its employees from all points at about 20 percent of their total employment, or 360 persons. While AC Transit accommodates some of the San Francisco employees by providing two morning and evening express buses from the Trans-Bay Terminal directly to the Richmond offices and back, the bulk of the San Francisco workers either drive or take BART. Those who drive to work find that only 850 parking spaces have been provided for the 1,850-employee facility, primarily in expectation of greater levels of public transit use. For those dependent on BART, a system of flexible working hours has been arranged, a system maligned as a source of inefficiency.

SSA officials report that their location was selected primarily because of its proximity to Richmond's BART station. But the flexible working hours policy, instituted to compensate for BART's unreliability, has resulted in a reduction of worker productivity. A two-percent reduction in the volume of processed Social Security claims, or about 70,000 of its 3.5 million monthly requirement, has been experienced since the Richmond move. In addition, the accuracy rate of claims processing has been reduced by one percent, contributing to the backlog of unprocessed claims. While BART's unreliability is not presumed to be the cause for these inefficiencies, the flexible hours program might not have been implemented without BART. Thus, the reduced productivity may be an indirect BART impact.

While SSA officials did not single out BART as the major cause of these efficiency losses, they did indicate disappointment in the level of services provided.

The backlog of claims that has accumulated since the relocation has required that many employees work on Saturdays, a situation particularly disadvantageous to San Francisco resident employees, since AC Transit express bus service is not available and BART is shut down on the weekends.

b. U. S. Energy Research and Development Administration (ERDA)

Officials of the U. S. Energy Research and Development Administration (ERDA) were equally committed to the selection of a location that afforded mass-transit accessibility in particular for use by its transit-dependent employees. ERDA offices are located at the Oakland City Center redevelopment project, adjacent to the City Center BART station. In addition to the Oakland site, an office complex adjacent to the Embarcadero BART station in San Francisco was retained to house its top-level regional management staff. ERDA's most recent estimates indicate that 90 percent of its employees drive automobiles to work.

The operating efficiencies claimed by ERDA were primarily the result of having direct BART access between its Oakland City Center offices adjacent to the City Center BART station and its San Francisco headquarters office near the Embarcadero BART station. This transportation link is used regularly to facilitate staff meetings between the directors of ERDA operations in both cities. While most of their top-level management staff are based in the San Francisco offices, the technical and clerical functions of the regional operations are carried out in the Oakland offices.

c. The Federal Bureau of Investigation (FBI)

The Berkeley office of the FBI was the smallest of the three agencies, yet it contributed the largest percentage of BART usage. Two of six agents use BART on a daily basis for their work-to-residence trips, one from Walnut Creek and the other from north Berkeley.

While the FBI was least concerned about BART service in its location decision, it makes the greatest use of the service as a percentage of all employees using BART in all three agencies.

The FBI offices operating in Berkeley near the Shattuck Avenue BART station reported relatively frequent use of BART service by its Berkeley-based agents in their Bay Area activities, particularly for trans-Bay crossings. In spite of the required transfer, FBI usage of BART has been sufficiently frequent to enable the Berkeley unit to relinquish one of its staff cars.

The reduced cost of FBI operation is the largest measurable efficiency advantage. ERDA officials who often use BART for their trans-Bay interoffice trips indicated that express bus service to their present downtown locations would serve as the equivalent of BART, thus equalizing the service of BART and the NBA. The fact that SSA employees find AC Transit express bus service from the San Francisco Trans-Bay Terminal superior to BART would suggest a negative impact of BART service, since without BART, these employees would rely on that form of transit which they deem superior.

V. CONCLUSIONS AND IMPLICATIONS

The Economics and Finance Project of the BART Impact Program was designed to contribute to the understanding of what impacts the construction and operation of rapid transit in the Bay Area have had on the region's economy and public financing. This technical memorandum focuses on the impacts which BART's transportation service, or BART's existence as part of the public infrastructure, has had on the efficiency of business and commerce within the region and the region's competitive advantage in attracting a greater share of the nation's growth.

The findings of this study have a bearing on the validity of economic development as a justification for transit investments. If rapid transit does not provide easier access to productive resources, or improve the efficiency of doing business in the region, it may not influence rational business location decisions. If it does not influence these decisions, transit service cannot be considered a sufficient condition for improving the economic strength of a region. This section reviews the findings and concludes with the implications of these findings for transit's role in economic development.

A. The Impact of BART's Transportation Service on Accessibility to a Larger Work Force

Improved accessibility could represent a potential locational advantage for business and commerce, since it would increase the size of the labor force within commuting distance of an employer's location. Improved access to this essential productive resource would represent an economic impact of BART service.

Although BART transportation service reduces average access time to employment centers within the region, the improvement in accessibility is not sufficient to significantly change perceived or actual employment opportunity or size of the available work force.

The estimated average access time for all zones in the three-county region to zones of high employment potential in the Bay Area is reduced by BART's contribution to the region's transportation system. The average reduction is estimated to be 19 percent, or eight minutes' difference between the average travel time of 43 minutes for the transit journey to work without BART and 35 minutes with BART. Higher-income households are estimated to experience an even greater travel time saving with BART, 22 percent. Households below poverty level and nonwhite households save only 10 percent in their average journey to work to

one of the zones of high employment potential. Although these time savings are an indication of improved accessibility, the research indicated that this had no effect on business productivity or the competitive advantage of the region in attracting business or industry.

B. The Impact of BART's Transportation Service on Accessibility to Employment

The other side of the issue of an employer's access to a larger work force is the access to employment for the region's residents. If BART service were to provide greater access to employment opportunities for actual or potential members of the work force, including the underemployed and ethnic minorities, it would represent an economic impact, since it would increase the utilization of the labor resources of the region.

The unemployed, however, experience an estimated reduction in their average access time to the 100 top employment zones within the region of 14 percent, reflecting only a five-minute saving between the 32-minute journey with BART and the 37-minute journey without BART. This distinction is not sufficiently substantial to suggest an increase in employment opportunity, perceived or real, as a result of BART's service.

C. The Impact of BART's Transportation Service on Business Efficiency

If substantial use of BART were made by employees in the course of business, it might be possible to identify an efficiency advantage from BART's transportation service. But less than 3.3 percent of the responses to the BART Passenger Profile Survey in 1976 indicated business-related use of BART during the AM peak period, and only 6.6 percent in the off-peak.

While there were indications in the interviewing program that business use that does occur with BART would not be replaced by use of alternative transit modes without BART, neither the ridership statistics nor the research program indicates an impact which significantly affects the efficiency of business operations in the Bay Area.

D. The Impact of Transit Service on the Region's Competitive Advantage in Attracting Business

Can rapid transit, through improving working conditions, economic efficiency, the availability of workers and the employment opportunity of the population, increase the productive use of regional resources to the extent that the region has a competitive advantage in attracting future national growth? Will

the region attract more than its share of new economic growth? Will the effect of transit on productivity of the region's resources, and even its effect on the region's image, cause corporations to locate (or expand) in this region, rather than another?

Statistical analysis of Bay Area employment since 1965 identified five types of economic activity in the region which grew at a rate which could not be explained by national growth patterns or industry growth patterns. These activities were government, central-office activities, services, finance and manufacturing. An extensive interviewing program was conducted to identify BART's potential impact on these growth patterns and determine whether BART was responsible for the answer to any of the previous questions.

The interviewing program supported three conclusions.

- There was no locational advantage for the BART service area compared to other areas in the Bay region, or other regions, because of the existence of BART. There are no instances in which BART service could be cited as a significant cause or reason for a location decision from outside the Bay Area.
- There are no instances cited in which BART provided a significant efficiency of operation for an existing business. BART usage is a convenience in many instances, but no case was identified in which the availability of BART's service would have a measurable effect on productivity or operating profit.
- There was no indication that BART in any way affected demand for the products of the Bay Area's export-base industry -- including the tourism industry.

E. The Impact of BART Service on Specific Economic Activities

Although the statistical analysis which identified industries which may have experienced a BART impact, and the extensive interviewing program which pursued the cause for these potential impacts yielded virtually no evidence of BART influencing corporate decisions on regional locations, nor that it improved significantly perceived or real productivity, efficiency or accessibility to a larger work force, four case studies were prepared to describe some specific impacts. The case studies documented research into the potential impacts in industries expected to be unusual in their likelihood of experiencing effects from BART service. Even these carefully selected examples provided no significant evidence of BART contributing to

the economic factors which would improve the region's competitive advantage in attracting future business, commercial or industrial activity.

1. Case Study: Central Office Activity

A case study was developed on the Clorox Company, which has recently relocated its headquarters office function to Oakland City Center, a location with excellent access to the BART system. If any efficiencies of operation for headquarters functions anywhere in the Bay Area were to be attributed to BART, it was hypothesized it would exist in this case. Access to BART, however, was not key to the location decision of the company, although use of BART for business purposes was considered a convenience.

2. Case Study: Health Care Delivery

A case study was prepared on the Kaiser Foundation medical services as an economic sector. While the Kaiser center in Richmond was located on a site served by BART, there was no indication that BART had an impact on the economic efficiency of providing medical service. BART was considered a convenience and was used in the course of Kaiser's business operations. A limited number of Kaiser patients utilized BART to take advantage of Kaiser's services, but, in fact, there was every indication that the same group would use public transit in the absence of BART. No other significant impact emerged from the case study.

3. Case Study: Finance

The branch banking operation of California Savings and Loan Company was selected to evaluate BART's potential utility as a facilitator of a technological innovation that would not have been possible with the No-BART Alternative. This innovation was a remote teller located within the Powell Street BART station, which permitted BART patrons to transact business from the station. Although market potential for the remote teller had been carefully researched, the results were disappointing. Moreover, although four of the institution's five branches are located in or near BART stations, BART was not considered a significant influence on the location decision, nor did it contribute to the efficiency of bank operations through expediting communications or interbank transfers.

4. Case Study: Government and Public Services

A case study was developed from interviews with three public agencies, the U. S. Energy Research and Development Administration (ERDA), the U. S. Social Security Administration (SSA),

and a field office of the Federal Bureau of Investigation (FBI).

ERDA's regional headquarters is located in San Francisco and an administrative center is located in the Oakland City Center Project. Although BART and its transportation service influenced the decision to locate in Oakland, this decision has had no consequential impact on efficiency of ERDA's operations or the improved ability to recruit employees. Nor was the location near BART deemed an advantage in the journey to work.

The SSA is located in Richmond and was responsible for a special twice-a-day Daly City-Richmond train designed to provide direct access to the Social Security Center by the employees who lived in San Francisco and were transit-dependent. The case study indicated that BART's reliability problems actually discourage its use and that BART service became a convenient explanation for tardiness.

The FBI field office in Berkeley provided the only example of identified efficiency from BART transportation service. Two of the six agents are regular BART commuters, and the agency was able to eliminate one of its six staff cars because agents could use BART in carrying out their daily responsibilities.

F. Implications for Economic Development Policy

The Composite Report, which described the benefits of BART to the voters who would approve BART's financing in 1962, expressed an expectation that prevails in transportation planning, even today: "The rapid transit system would improve the area's living and working conditions, economic efficiency and availability of workers, and attract a larger share of the nation's future growth." This expectation is also integral to urban and economic development policies, which have frequently accepted transit as a sufficient condition for urban and economic development.

In earlier stages of urbanization, perhaps in a young and growing city, rapid transit might stimulate regional economic activity. Even then, however, transit's contribution may be the shaping of cities, which, through the advantages of density and the proximity of services, make a region a more attractive location for business. But these early stages of urbanization are past in most metropolitan areas.

There is no evidence from this research that any industry moved to the Bay Area because BART or BART's service influenced the corporate decisionmaking process. There is no evidence of even the perception that BART improved the economic viability of the

region, or the efficiency with which the region's resources could be utilized.

These findings suggest that the level of transportation service which is considered essential to economic viability in location decisions has been reached with the combined resources for interurban travel provided by existing highways and transit networks. The marginal impact of improved rapid transit service on movement within the region, if BART is representative, is not sufficient to stimulate economic development. Rapid transit, if introduced to a region, may have impacts on the locational decisions of business, commerce or industry within the region. But these impacts represent spatial or land-use impacts and do not bear on the competitive advantage of the region itself in gaining a larger share of the nation's future growth. Instead, the development which occurs in the vicinity of transit stations, so frequently cited as visible evidence of transit's impact on regional economic development, may represent only shifting piles of sand within a region.

This conclusion is drawn from observing the impact of BART -- an unusual high-technology regional rapid transit system -- on the Bay Area -- a decidedly well-balanced economic system in a mature region, with a fully developed infrastructure. Nonetheless, it should not be assumed the findings are not transferable. Most urbanized regions today are mature regions. Moreover, economic development arguments in support of rapid transit investment almost always seek to justify transit as an element of urban, not regional, development, at least in the majority of cities seeking to implement rapid transit systems today. Since virtually all of the nation's cities are mature (some with underutilized infrastructure), the urban centers for which transit is sought as a stimulus for economic development are not growth areas which are in contradistinction to the Bay Area's maturity. In their maturity, most urbanized areas have passed the threshold of an adequate level of transportation service (the necessary condition) to attract economic activity.

Despite this project's findings, it is possible to create the appearance of economic growth resulting from transit investment. Transit can be responsible for causing development and growth which would occur in the region anyway to locate in the vicinity of transit stations. If the "region" is defined to include only the urban core or the transit corridors, this development -- which is actually drawn from elsewhere in the region -- would appear as a transit impact, attracting a larger share of the nation's future growth.

The policy contradiction inherent in this focusing on a sub-region is its counterintervention of federal initiatives for programs to be considered on a truly regional basis. More

importantly, it would undermine the political acceptability of regional financial support for the local share of a system which explicitly identifies subregional benefits, both transit and economic. This approach would acknowledge that an urban system is being funded by taxes raised in suburban areas. To compound the potential unpopularity of this concept, the system being funded would increase the future tax rolls of the city at the expense of the suburbs.

Yet, the most prominent use of the argument that transit stimulates regional economic activity is in gaining regional support for financing a system which provides transportation benefits to only a small portion of the regional population. The implications of the findings of this project are that this argument is insupportable. Justification for suburban participation in the financing of urban mass rapid transit systems should recognize instead that this financing represents a direct subsidy of urban and economic revitalization and development objectives, not necessarily an investment to increase the competitive advantage of the region.

These findings would encourage the focus of transit planning which is premised on economic development objectives to be confined to improving accessibility intraregionally. If an objective is to revitalize urban cores, accessibility should be improved to redirect growth within the region. Although the regional share of the nation's future growth may not change from investment in transit, the urban core may gain a greater proportion of that growth if transit improves accessibility to a central place. But it is also possible that even improved accessibility will not stimulate that revitalization.

The impacts of transit improvements may be limited to better utilization of existing resources within a region, which does represent an appropriate and beneficial objective, particularly in areas of underutilized resources, whether plant or labor.

The Economics and Finance Project findings do not support the hypothesis that improved transit service can attract business, commerce or industry to a region. Corporate decisionmakers do not consider transit service levels explicitly among the criteria governing the choice among regions as a location for economic activity. First, they are not themselves transit dependent, so they may be less sensitive to these needs. Second, they expect any modern city to have adequate transit service for employees. The additional capacity provided by BART is, to some extent, viewed as merely maintaining an adequate modern system. Moreover, use of the telephone, electronic data processing and other forms of telecommunication have sufficiently changed the manner of doing business that

improved transit service should not be expected to affect the efficiency of business operations.

The only remaining potential socioeconomic impact, then, is in improving the accessibility to employment for the region's residents. In the case of BART, this represents more an aspect of convenience than necessity.

The implications of these findings for urban and economic development policies include the suggestion that a frequently articulated justification for transit improvements in a region is no longer valid. This does not mean that an investment in transit represents a zero sum game for a region. An economic impact will result from the capital and operating expenditures on transit, which may be a federal transfer of funds to a region which would not otherwise occur.

APPENDIX A
SHIFT/SHARE METHODOLOGY AND DATA SOURCES

APPENDIX A

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Appendix A

SHIFT/SHARE METHODOLOGY AND DATA SOURCES

The purpose of this appendix is to document the analysis used to identify the economic sectors which experienced unusually high levels of growth in the Bay Area during the study period.

The technique used to evaluate the change in structure of the Bay Area economy was a shift/share analysis of employment over the time period 1965 to 1970 -- the period during which, by conjecture, any initial BART impacts on the Bay Area economy would have occurred. The final year, 1973, was selected because it is the most recent year for which Census data on employment by sector (by county) was available.¹

An intention to analyze the shift in share of gross sales was discontinued after a review of the data source indicated that restrictions on disclosure because of confidentiality severely limited the possible scope of the analysis.

A. The Shift/Share Methodology

Shift/share analysis is often used as a technique for forecasting interregional industrial growth.² It provides a means for analyzing and interpreting large amounts of historical data, to determine changes in a regional economy. It does not, however, describe the causal mechanisms for changes.

¹The 1974 and 1975 County Business Pattern data were released concurrently, following completion of this analysis.

²Association of Bay Area Governments, Economic Activity in the San Francisco Bay Area, Technical Report, San Francisco, August 1971, p. 368; Ashby, Lowell, "Shift and Share Analysis: A Reply", Southern Economic Journal, Vol. 34, No. 2, 1969; Davis, H. W., R. T. Newson and D. E. O'Neill, "Rate Weight Analysis: A Suggested Technique for Examining Regional-National Growth Rate Differentials", Annals of Regional Science, Vol. V, No. 2, 1971; Esteban-Marquillas, James, "A Reinterpretation of Shift/Share Analysis", Regional and Urban Economics, Vol. 2, No. 3, 1972, pp. 249-255; Houston, D. B., "Shift and Share Analysis of Regional Growth: A Critique", Southern Economic Journal, Vol. 34, 1967, pp. 577-581; MacKay, D. B., "Industrial Structure and Regional Growth", Scottish Journal of Political Economy, Vol. 15, 1968; Stillwell, F.J.B., "Regional Growth and Structural Adaptation", Urban Studies, Vol. 1, 1971, pp. 77-87.

Shift/share analysis is based upon a simple identity:

E_{ij_t} = some measure of activity (normally employment)
in industry i in region j at time t ,

$E_{i_t} = \sum_j E_{ij_t}$ = total activity in industry i ,

$E_t = \sum_i \sum_j E_{ij_t}$ = total activity,

$\Delta E_{ij_t} = E_{ij_t} - E_{ij_{t_0}}$ ($E_{ij_{t_0}}$ = initial E_{ij_t})

The simple shift/share model can be formulated as an identity:

$$\Delta E_{ij_t} = E_{ij_{t_0}} \left[\underbrace{\left(\frac{E_t}{E_{t_0}} - 1 \right)}_{\text{Base Growth Rate}} + \underbrace{\left(\frac{E_{i_t}}{E_{i_{t_0}}} - \frac{E_t}{E_{t_0}} \right)}_{\text{Industrial Mix}} + \underbrace{\left(\frac{E_{ij_t}}{E_{ij_{t_0}}} - \frac{E_{i_t}}{E_{i_{t_0}}} \right)}_{\text{Competitive Shift}} \right]$$

Each of the terms on the right-hand side of the equation can be interpreted as a component of total percent change in employment for a given industry in a given region. The first term indicates the overall trend in employment growth and is labeled the "Base Growth Rate". The second term is labeled the "Industrial Mix", since it indicates whether the particular industry (wherever it is located) is growing faster or slower than the base economy. The third term measures the relative growth rate of an industry in a region compared to the average growth rate for that industry in all regions in the base economy. It isolates the "Competitive Shift" or the relative ability of the region to compete for growth in the industry being considered.

The hypothesis justifying the description of the third term in the shift/share identity as the "Competitive Shift" is a simple one. Managers continually make decisions to reduce or expand activities based on a wide variety of industrywide considerations, such as expected sales growth or changes in technology. However, the decision as to where to expand or relocate depends on a specific matrix of regional characteristics, including access to factors of production (e.g., skilled labor), regional market potential (e.g., growth in personal income), public amenities, environmental conditions, management's discretion, etc. These everyday locational decisions contribute to a cumulative increase or decrease in a given region's "share" of a particular industry's economic activity. Thus, groups of regions with similar characteristics compete to capture a larger share of each industry's economic growth (or to mitigate declines in activity).

Conventionally, a shift/share analysis uses total U. S. employment (and total U. S. employment for a given industry) as the base against which regional growth in that industry is analyzed. This convention is not a requirement. The mathematic identity holds for any "base" (the western United States, California, the Bay Area, etc.) and for any "region" (the nine-county Bay Area, the three BART counties, or a single county).

The attempt to identify shifts in employment that might be confirmed by more detailed analysis to be BART impacts depends on this property of shift/share analysis. The research approach was structured to compare the employment shifts in the three-county BART area to other "bases" which might identify unexplained changes in the Bay Area economic structure. The bases include:

- Other "headquarters" regions throughout the United States, to compare the Bay Area to its national "competition";
- Major West Coast SMSAs, to compare the Bay Area to its regional competition; and
- The nine-county San Francisco Bay Area, to compare the three BART counties to the general growth experienced in the entire Bay Area, including the non-BART counties.

The approach had some similarity to a conventional "control group" research design, where the BART counties would be compared to other areas that are, in some sense, similar, except that the comparison group did not have a BART-like rapid transit system implemented during the same study period. The difficulty of using a control area approach¹ in transportation impact analysis is to be avoided, in part, by the use of three "comparison areas", rather than one.

The "headquarters" SMSAs used for the first analysis were selected after a review of both SMSA employment statistics and a review of previous attempts to classify economic areas in the

¹Specifically, it was recognized that it is virtually impossible to identify a control area that is truly representative of the BART counties, except for the presence of a mass transit system. For a discussion of the control area approach, see Charles River and Associates, Inc., Measurement of the Effects of Transportation Change, prepared for the Urban Mass Transportation Administration, September 1972, pp. 2-23 to 2-24 and 4-35 to 4-36.

United States.¹ This selected group of headquarters SMSAs was used as a base for a shift/share analysis of the San Francisco Bay Area and for the BART counties. The concept, once again, is that suggestive information regarding changes in the structure of the Bay Area economy should be based on a comparison with other regions and SMSAs that play a comparable economic role.² The SMSAs identified as the headquarters base include:

- Atlanta SMSA;
- Baltimore SMSA;
- Boston SMSA;
- Chicago SMSA;
- Dallas SMSA;
- Denver SMSA;
- Detroit SMSA;
- Houston SMSA;
- Los Angeles SMSA;
- New York SMSA;
- San Francisco-Oakland SMSA;
- Philadelphia SMSA;
- Pittsburgh SMSA;
- San Jose SMSA;
- St. Louis SMSA; and
- Twin Cities (Minneapolis/St. Paul) SMSA.

The next group of SMSAs used as a basis for comparison with the San Francisco Bay Area are the SMSAs that generally compete with the San Francisco Bay Area as location candidates in the western United States. The SMSAs included in this portion of the analysis are San Diego, Anaheim-Santa Ana-Garden Grove (Orange County), Los Angeles-Long Beach (Los Angeles County), Oxnard-Simi Valley-Ventura (Ventura County), Sacramento, Portland, and Seattle-Everett.

¹For examples and a discussion of "headquarters regions", see Brian J. Berry, Ed., City Classification Handbook: Methods and Application, Wiley-Interscience, New York, 1971; Harris, Curtis C., Jr., The Urban Economy in 1985: A Multiregional, Multiindustry Forecasting Model, Lexington, D. C. Heath & Co., 1973; U. S. Bureau of the Census, Enterprise Statistics: 1972, Part 2, Central Administrative Offices and Auxiliaries, ES 72-2, Washington, D. C., U. S. Government Printing Office, 1976.

²To reiterate, there is no claim that this analysis identified "BART impacts". The analysis did not permit an assertion that shifts in the Bay Area economy possibly associated with BART would not also have been associated with the NBA.

Finally, shifts in employment for the BART counties were evaluated, using the nine-county Bay Area as the base. The employment bases are documented in Appendix B to this technical memorandum.

Table A-1 defines the industrial sectors used in the analysis. Although 66 sectors were defined, disclosure restrictions on employment data reduced the output to fewer sectors.

B. Content of the Shift/Share Analysis

The actual shift/share analysis is displayed in two separate formats. First, as illustrated in Table A-2, a separate report series was printed for each "base(e.g., the headquarters SMSAs as a base, the nine-county Bay Area as a base) and each region was compared against that base. The symbol "N/A" indicates missing data because of restrictions on disclosure.

The example in Table A-2 is for the headquarters SMSAs as a base. The following examples are used to help explain the contents of the illustration. The numbers refer to points indicated in Table A-2.

1. Total Employment

The total employment in the base, consisting of all the headquarters SMSAs, increased 11.98 percent over the period 1965 to 1973.

2. Subareas

Table A-2 compares four subareas (the three-county BART area and each county in the area) against the base of all headquarters SMSAs.

3. Industry Mix

The industry mix (i.e., the term in the shift/share identity representing the growth of the sector in the entire base) is a function of the definition of the base and does not vary from subarea to subarea. For example, the industry mix for Sector 1, Agricultural Services, increased by 29.7 percent in the headquarters SMSAs.

4. Sector Example

Using Sector 42, Legal Services, and Alameda County as an example, the columns in the illustration have the following meanings:

- This sector made up 0.51 percent of the total employment in the subarea (i.e., in Alameda County);

Table A-1

DEFINITION OF THE INDUSTRIAL SECTORS

THE STANDARD INDUSTRIAL CLASSIFICATIONS (SIC-S) IN THE LEFT-HAND COLUMN WERE CONSIDERED, AND WERE INCLUDED IN THE INDUSTRIAL SECTOR SHOWN IN THE RIGHT-HAND COLUMN

SIC DESCRIPTION	PUT IN SECTOR	SIC DESCRIPTION	PUT IN SECTOR
0A AGRICULTURAL SERVICES	1. AGRIC. SER	4700 TRANSPORTATION SERVICES	26. TRANS SERV
0100 AGRICULTURAL PRODUCTION - CROPS	53. AGRICULT.	4800 COMMUNICATION	27. COMMUN.
0700 AGRICULTURAL PRODUCTION - LIVESTOCK	53. AGRICULT.	4900 ELECTRIC, GAS AND SANITARY SERVICE	63. UTILITIES
0900 FORESTRY	54. FORESTRY	58A RETAIL TRADE ADMINISTRATIVE AND AUXILIARY	61. RETAIL AUX
0900 FISHING, HUNTING, AND TRAPPING	54. FORESTRY	58 RETAIL TRADE	30. RETAIL
1CA CONTRACT CONSTRUCTION ADMINISTRATIVE AND AUX	47. CONST. AUX	58A WHOLESALE TRADE ADMINISTRATIVE AND AUXILIAR	60. WHOLE. AUX
1C CONTRACT CONSTRUCTION	3. ALL CONST	58 WHOLESALE TRADE	29. WHOLESALE
1MA MINING ADMINISTRATIVE AND AUXILIARY	59. MINING AUX	5200 BUILDING MATERIALS AND FARM EQUIPMENT	58. RETAIL SUB
1M MINING	2. MINING	5300 GENERAL MERCHANDISE	58. RETAIL SUB
1000 METAL MINING	55. MINING SUB	5400 FOOD	58. RETAIL SUB
1100 ANTHRACITE MINING	55. MINING SUB	5500 AUTOMOTIVE DEALERS AND SERVICE STATIONS	58. RETAIL SUB
1200 BITUMINOUS COAL AND LIGNITE MINING	55. MINING SUB	5600 APPAREL AND ACCESSORIES	58. RETAIL SUB
1300 CRUDE PETROLEUM AND NATURAL GAS	55. MINING SUB	5700 FURNITURE AND HOME FURNISHINGS	58. RETAIL SUB
1400 NONMETALLIC MINERALS, EXCEPT FUELS	55. MINING SUB	5800 EATING AND DRINKING PLACES	58. RETAIL SUB
1500 GENERAL CONTRACTORS, BUILDINGS	4. BLD. CONST	5900 MISCELLANEOUS RETAIL STORES	58. RETAIL SUB
1600 GENERAL CONTRACTORS, EXCEPT BUILDINGS	56. OTHER CONS	6FA FINANCE, INSURANCE AND REAL ESTATE ADMIN.	50. FINAN. AUX
1700 SPECIAL TRADE CONTRACTORS	5. TRADE CONT	6F FINANCE, INSURANCE AND REAL ESTATE	36. ALL FINANC
1700 ORDNANCE AND ACCESSORIES	22. MISC. MANU	6000 BANKING	31. BANKING
2M MANUFACTURING	6. ALL MANUF.	6100 CREDIT AGENCIES OTHER THAN BANKS	31. BANKING
2000 FOOD AND KINDRED PRODUCTS	7. FOOD PROD.	6200 SECURITY AND COMMODITY BROKERS AND SERVICES	32. SECURITIES
2100 TOBACCO MANUFACTURES	22. MISC. MANU	6300 INSURANCE CARRIERS	33. INSURANCE
2200 TEXTILE MILL PRODUCTS	8. TEXTILES	6400 INSURANCE AGENTS, BROKERS AND SERVICES	33. INSURANCE
2300 APPAREL AND RELATED PRODUCTS	9. APPAREL	6500 REAL ESTATE	34. REAL ESTAT
2400 LUMBER AND WOOD PRODUCTS	10. WOOD PROD.	6600 COMBINED REAL ESTATE, INSURANCE, ETC.	34. REAL ESTAT
2500 FURNITURE AND FIXTURES	10. WOOD PROD.	6700 HOLDING AND OTHER INVESTMENT COMPANIES	35. HOLDING CO
2600 PAPER AND ALLIED PRODUCTS	16. PAPER PROD	75 SERVICES	46. SERVICES
2700 PRINTING AND PUBLISHING	11. PRINTING	7000 HOTELS AND OTHER LODGING PLACES	37. HOTELS
2800 CHEMICALS AND ALLIED PRODUCTS	12. CHEMICALS	7200 PERSONAL SERVICES	39. PERS. SERV
2700 PETROLEUM REFINING AND RELATED INDUSTRIES	17. PETROLEUM	7300 MISCELLANEOUS BUSINESS SERVICES	38. BUS. SERV.
34A MANUFACTURING ADMINISTRATIVE AND AUXILIARY	40. MANUF. AUX	7500 AUTOMOBILE REPAIR, SERVICES AND GARAGES	39. PERS. SERV
3000 RUBBER AND PLASTICS PRODUCTS, N.E.C.	18. PLAST-GLAS	7600 MISCELLANEOUS REPAIR SERVICES	39. PERS. SERV
3100 LEATHER AND LEATHER PRODUCTS	22. MISC. MANU	7000 MOTION PICTURES	40. ENTERTAINM
3200 STONE, CLAY, AND GLASS PRODUCTS	18. PLAST-GLAS	7200 AMUSEMENT AND RECREATION SERVICES, NEC	40. ENTERTAINM
3300 PRIMARY METALS INDUSTRIES	19. PRIM METAL	85A SERVICES ADMINISTRATIVE AND AUXILIARY	51. SERVIC AUX
3400 FABRICATED METAL PRODUCTS	20. FAB. METAL	8U UNCLASSIFIED ESTABLISHMENTS	62. UNCLASS.
3500 MACHINERY, EXCEPT ELECTRICAL	13. MACHINERY	8000 MEDICAL AND OTHER HEALTH SERVICES	41. HEALTH SER
3600 ELECTRICAL MACHINERY	14. ELECT MACH	8100 LEGAL SERVICES	42. LEGAL SERV
3700 TRANSPORTATION EQUIPMENT	15. TRAN EQUIP	8200 EDUCATIONAL SERVICES	43. EDUC. SERV
3800 INSTRUMENTS AND RELATED PRODUCTS	21. INSTRUMENT	8400 MUSEUMS, BOTANICAL AND ZOOLOGICAL GARDENS	57. MUSEUMS
3900 MISCELLANEOUS MANUFACTURING	22. MISC. MANU	8600 NONPROFIT MEMBERSHIP ORGANIZATIONS	44. NONPROFIT
4TA TRANSPORTATION ADMINISTRATIVE AND AUXILIARY	40. TRANS. AUX	8700 MISCELLANEOUS SERVICES	45. MISC. SERV
4T TRANSPORTATION	23. ALL TRANSP	9T ALL GOVERNMENT	64. ALL GOVT.
4100 LOCAL PASSENGER TRANSPORTATION	24. PASS. TRAN	9100 FEDERAL GOVERNMENT	64. FED. GOV.
4200 TRUCKING AND WAREHOUSING	27. OTHER TRAN	9200 STATE GOVERNMENT	65. STAT-LOCAL
4400 WATER TRANSPORTATION	25. SHIP, AIR	9293 STATE AND LOCAL GOVERNMENT	65. STAT-LOCAL
4500 TRANSPORTATION BY AIR	25. SHIP, AIR	9300 LOCAL GOVERNMENT	65. STAT-LOCAL
4600 PIPE LINES, EXCEPT NATURAL GAS	27. OTHER TRAN	99 TOTAL FOR THE AREA	52. TOTAL EMPL

Source: U.S. Department of Commerce, Bureau of Economic Analysis and McDonald & Greffe, Inc.

Table A-2

AN ILLUSTRATIVE SHIFT/SHARE ANALYSIS

BASE GROWTH RATE ① 11.98 PERCENT, FOR THE HEADQUARTERS SMSA-S

SECTOR DESCRIPTION	② • BART 3-COUNTY AREA				• ALAMEDA COUNTY				• CONTRA COSTA COUNTY				• SAN FRANCISCO COUNTY			
	BASE	SECTOR	COMPET.	TOTL EMP	SECTOR	COMPET.	TOTL EMP	SECTOR	COMPET.	TOTL EMP	SECTOR	COMPET.	TOTL EMP	SECTOR	COMPET.	TOTL EMP
	INDUSTRY	AS PCT.	SHIFT	SHIFT	AS PCT.	SHIFT	SHIFT	AS PCT.	SHIFT	SHIFT	AS PCT.	SHIFT	SHIFT	AS PCT.	SHIFT	SHIFT
	MIX OF AREA (PCT) • EMP TOTAL				OF AREA • EMP TOTAL			OF AREA • EMP TOTAL			OF AREA • EMP TOTAL			OF AREA • EMP TOTAL		
1 AGRIC. SER	29.7	.26	10.30	51.98	.35	71.51	113.20	.62	42.33	84.01	.10	-66.36	-24.68			
2 MINING	9.2	.14	-57.33	-36.13	.19	-59.47	-38.27	.35	24.67	45.87	.06	-85.70	-64.50			
3 ALL CONST	-7.1	5.44	-18.07	-13.25	5.42	-18.72	-13.91	7.57	-22.41	-17.59	4.90	-15.63	-10.81			
4 BLDG. CONST	8.7	1.37	-44.99	-24.23	1.62	-38.89	-18.13	2.03	-54.66	-33.90	1.00	-46.13	-25.37			
5 TRADE CONT	-12.5	2.56	-19.32	-19.26	2.95	-9.76	-10.30	3.80	-5.05	-5.59	1.96	-32.55	-33.09			
6 ALL MANUF.	-17.7	19.85	5.30	-4.42	26.34	12.00	6.28	24.79	1.64	-4.09	13.65	-1.59	-7.22			
7 FOOD PROC.	-31.7	2.62	-7.71	-20.52	3.74	5.49	-14.32	1.87	-3.67	-23.48	1.96	-7.63	-27.44			
8 TEXTILES	-6.3	.08	12.62	18.21	.05	-63.53	-57.95	0.00	0.00	0.00	.13	176.74	182.32			
9 APPAREL	-12.2	1.35	38.90	38.59	.47	58.68	58.37	0.00	0.00	0.00	2.36	36.33	36.02			
10 WOOD PROD.	-4.4	.63	-14.39	-6.82	1.04	-16.81	-9.25	.39	26.79	34.35	.38	-16.66	-9.10			
11 PRINTING	-15.3	1.94	-7.62	-11.04	1.32	-10.17	-13.59	1.37	87.91	84.49	2.57	-12.66	-16.07			
12 CHEMICALS	.7	1.07	-19.61	-6.88	1.46	-7.88	4.85	2.82	-29.40	-16.67	.32	-29.46	-16.73			
13 MACHINERY	-2.2	1.53	5.69	15.39	2.99	9.03	18.73	1.17	97.94	107.64	.51	-26.45	-16.76			
14 ELECT MACH	-15.1	.91	64.20	61.04	1.05	50.22	47.07	1.83	68.76	65.61	.56	84.52	81.37			
15 TRAN EQUIP	-20.6	1.63	19.09	10.40	3.65	26.49	17.80	.67	52.66	43.97	.35	-22.77	-31.46			
16 PAPER PROD	-6.5	.70	-25.50	-20.07	1.01	-22.60	-17.17	1.89	-29.94	-24.50	.16	-24.57	-19.13			
17 PETROLEUM	-24.1	.54	-11.13	-23.33	.06	30.61	18.40	4.06	-12.36	-24.56	0.00	0.00	0.00			
18 PLAST-GLAS	-9.1	N/A	N/A	N/A	2.17	23.61	26.44	N/A	N/A	N/A	.23	-50.34	-47.50			
19 PRIM METAL	-27.2	1.04	6.85	-8.38	1.67	24.30	9.07	2.47	-14.35	-29.57	.19	1.37	-13.85			
20 FAB. METAL	5.4	2.09	-13.51	3.90	3.29	-9.04	8.37	2.32	27.39	44.80	1.13	-33.72	-16.31			
21 INSTRUMENT	-14.3	N/A	N/A	N/A	.29	24.64	22.28	N/A	N/A	N/A	.08	97.78	95.42			
22 MISC. MANU	-35.8	.23	53.20	25.23	.10	157.21	133.33	.28	273.88	250.00	.32	27.86	3.98			
23 ALL TRANSP	-8.1	10.86	19.52	23.31	9.38	29.24	33.03	7.87	54.39	58.17	12.76	10.83	14.62			
24 PASS. TRAN	10.3	1.10	-20.56	1.81	.74	-1.24	21.13	.80	50.41	72.78	1.45	-31.51	-9.14			
25 SHIP. AIR	.1	2.08	21.65	33.78	1.47	278.93	291.05	.21	-41.71	-29.58	3.03	-2.96	9.16			
26 TRANS SERV	6.6	.53	24.15	42.79	.23	43.86	62.50	.09	130.08	148.72	.87	19.17	37.80			
27 OTHER TRAN	-16.3	2.13	5.49	5.12	3.03	6.70	2.33	1.74	30.38	26.01	1.55	8.71	4.34			
28 COMMUN.	14.2	N/A	N/A	N/A	2.56	11.52	37.72	N/A	N/A	N/A	N/A	N/A	N/A			
29 WHOLESale	-3.8	8.66	-6.02	2.13	8.16	4.70	12.86	4.08	18.71	26.87	10.21	-13.39	-5.24			
30 RETAIL	4.2	18.86	4.65	21.09	21.61	10.56	26.81	27.90	39.70	55.95	14.44	-12.09	4.16			
31 BANKING	26.4	4.91	12.18	50.65	2.54	11.53	50.00	2.26	6.05	44.52	7.39	12.85	51.22			
32 SECURITIES	36.5	.71	9.20	57.70	.12	-48.50	0.00	.19	68.54	117.05	1.30	14.28	62.78			
33 INSURANCE	2.8	3.17	-12.99	1.78	.44	18.69	33.47	1.34	65.96	80.74	5.72	-16.52	-2.15			
34 REAL ESTAT	27.7	N/A	N/A	N/A	2.17	37.39	77.15	N/A	N/A	N/A	2.11	-10.15	29.61			
35 HOLDING CO	46.9	.27	-11.24	47.69	.16	-50.57	8.35	0.00	0.00	0.00	.43	5.08	64.00			
36 ALL FINANC	5.7	12.10	17.30	34.98	7.46	30.46	48.13	6.48	88.23	105.90	17.07	9.28	26.96			
37 HOTELS	6.7	1.88	5.25	23.99	1.00	12.01	30.75	.53	-12.09	6.65	2.90	4.52	22.24			
38 BUS. SERV.	35.4	4.90	17.86	65.25	3.91	14.08	61.52	2.86	71.39	118.82	6.18	14.93	82.36			
39 PERS. SERV	-25.8	2.70	13.16	-6.67	2.84	14.51	.68	3.01	36.06	22.23	2.51	6.72	-7.11			
40 ENTERTAINM	6.8	N/A	N/A	N/A	1.28	-4.70	14.12	N/A	N/A	N/A	1.55	16.56	35.38			
41 HEALTH SER	37.0	5.89	22.27	71.32	7.00	25.36	74.41	7.63	118.47	167.52	4.60	-3.16	45.85			
42 LEGAL SERV	49.8	N/A	N/A	N/A	.51	5.55	67.42	N/A	N/A	N/A	2.74	22.32	64.19			
43 EDUC. SERV	24.3	.53	55.04	91.38	1.00	26.81	63.14	1.18	200.54	236.87	0.00	0.00	0.00			
44 NONPROFIT	20.3	2.67	14.53	46.84	1.88	-12.11	20.18	1.85	64.39	96.68	3.48	23.30	55.59			
45 MISC. SERV	26.4	1.75	-2.22	36.23	1.20	-10.43	28.02	1.24	106.83	145.28	2.30	-7.02	31.42			
46 SERVICES	18.5	23.49	15.17	45.66	20.81	11.29	41.78	19.77	63.23	93.72	26.49	10.73	41.21			
47 CONST. AUX	-7	N/A	N/A	N/A	N/A	N/A	N/A	0.00	0.00	0.00	.26	417.97	429.17			
48 MANUF. AUX	8.9	N/A	N/A	N/A	N/A	N/A	N/A	1.52	-12.73	8.23	2.43	-26.12	-5.16			
49 TRANS. AUX	87.2	N/A	N/A	N/A	.19	-14.74	84.52	N/A	N/A	N/A	N/A	N/A	N/A			
50 FINAN. AUX	24.0	.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.12	0.00	0.00			
51 SERVIC AUX	20.5	N/A	N/A	N/A	N/A	N/A	N/A	0.00	0.00	0.00	.16	91.17	123.74			
63 UTILITIES	12.3	N/A	N/A	N/A	1.15	-1.13	23.16	N/A	N/A	N/A	N/A	N/A	N/A			
64 FED. GOV.	-8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
65 STAT-LOCAL	79.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
66 ALL GOVT.	22.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			

TOTAL EMPLOYMENT IN BASE AREAS - 1973

2036814

SUB-AREA EMPLOYMENT - 1973

799779

300938

102303

396538

INDUSTRY MIX FOR SUB-AREA

8839

⑤

2152

-1591

16795

COMPETITIVE SHIFT FOR SUB-AREA

14544

18779

14315

-17218

TOTAL SHIFT FOR SUB-AREA

121708

51540

25265

44903

Source: U.S. Department of Commerce, Bureau of Economic Analysis
and McDonald & Greffe, Inc.

- The "Competitive Shift" (i.e., the portion of total growth in the sector that can be interpreted as the competitive advantage attributable to locational or other characteristics of Alameda County) totaled a positive 5.55 percent;
- The total shift in employment for the Legal Services sector was 67.42 percent;
- In summary, comparing growth in legal services for Alameda County and for all headquarters SMSAs in the United States, the results can be interpreted as follows:

<u>Component</u>	<u>Growth</u>
Average growth in employment in the headquarters SMSAs	11.98%
Growth in employment in legal services in all headquarters SMSAs	49.80%
Competitive position of Alameda County	<u>5.55%</u>
Total Growth in Alameda County	67.33% ¹

5. Total Shifts and Industry Mix

The totals shown at the bottom of the illustration represent absolute values of employment, rather than percents, and are the algebraic sum of the percent calculations for each sector multiplied by the 1965 employment base. In the case of Alameda County, the sum of total shifts in employment totals 51,540 jobs, of which 18,779 can be attributed to competitive shifts and 2,152 to the strength of the industry mix. The remainder is represented by average growth in all the headquarters SMSAs.

C. Competitive Shift

The second phase of the analysis is illustrated in Tables A-3 and A-4. In these exhibits, the competitive shift for each sector is ranked from largest to smallest to identify those sectors that have shown the greatest competitive advantage over the period 1965 to 1973. The analysis is repeated for each of the bases (headquarters SMSAs, West Coast SMSAs and the nine-county Bay Area) that were used in the analysis.

¹The difference between the algebraic total of 67.33 percent and the printed total of 67.42 percent is not a round-off error. It is function of the procedure that was used to deal with disclosure restrictions on the data. This is explained subsequently.

Table A-3

AN ILLUSTRATION OF RANKING OF COMPETITIVE SHIFT¹ ALAMEDA COUNTY 1965 - 1973

HEADQUARTERS SMSA-5			ANALYSIS BASED ON TOTAL EMPLOYMENT IN THE BASES				9-COUNTY BAY AREA		
RANK	INDUSTRY	SCORE	RANK	INDUSTRY	SCORE	RANK	INDUSTRY	SCORE	
1	SHIP, AIR CARGO	278.93	1	SHIP, AIR CARGO	238.63	1	SHIP, AIR CARGO	249.77	
2	MISC. MANUFACTURING	157.21	2	MISC. MANUFACTURING	153.66	2	MISC. MANUFACTURING	153.87	
3	AGRIC. SERVICES	71.51	3	AGRIC. SERVICES	60.96	3	AGRIC. SERVICES	67.56	
4	APPAREL	58.68	4	PETROLEUM	29.93	4	LEGAL SERVICES	42.72	
5	ELECT MACHINERY	50.22	5	APPAREL	29.28	5	PETROLEUM	41.28	
6	TRANS SERVICES	43.86	6	TRAN EQUIPMENT	20.63	6	APPAREL	22.55	
7	REAL ESTATE	37.39	7	COMMUN.	20.18	7	INSURANCE	21.91	
8	PETROLEUM	30.61	8	REAL ESTATE	16.83	8	PASS. TRANSPORTATION	17.84	
9	ALL FINANCE	30.46	9	INSURANCE	14.58	9	MINING	16.20	
10	ALL TRANSPORTATION	29.24	10	BANKING	13.13	10	REAL ESTATE	14.03	
11	EDUC. SERVICES	26.81	11	PASS. TRANSPORTATION	10.85	11	TRAN EQUIPMENT	12.79	
12	TRAN EQUIPMENT	26.49	12	ALL FINANCE	10.81	12	ALL FINANCE	8.20	
13	HEALTH SERVICES	25.36	13	LEGAL SERVICES	6.40	13	PRIM METALS	6.40	
14	INSTRUMENTS	24.64	14	ALL TRANSPORTATION	5.76	14	FAB. METALS	6.03	
15	PRIM METALS	24.30	15	UTILITIES	4.15	15	ALL TRANSPORTATION	1.87	
16	PLAST-GLASS PRODUCTS	23.61	16	PLAST-GLASS PRODUCTS	2.28	16	ALL GOVT.	0.00	
17	INSURANCE	18.69	17	ELECT MACHINERY	.13	17	STAT-LOCAL GOVT.	0.00	
18	PERS. SERVICES	14.51	18	BUS. SERV.	.02	18	FED. GOV.	0.00	
19	BUS. SERV.	14.08	19	ALL GOVT.	0.00	19	WOOD PROD.	-3.34	
20	HOTELS	12.01	20	STAT-LOCAL GOVT.	0.00	20	HOTELS	-1.21	
21	ALL MANUF.	12.00	21	FED. GOV.	0.00	21	COMMUN.	-1.88	
22	BANKING	11.53	22	FINAN. AUXILIARY	0.00	22	BANKING	-1.98	
23	COMMUN.	11.52	23	HEALTH SERVICES	-.89	23	CHEMICALS	-2.40	
24	SERVICES	11.29	24	PRIM METALS	-4.09	24	TRADE CONTRACTORS	-2.67	
25	RETAIL	10.56	25	PERS. SERVICES	-5.04	25	MISC. SERVICES	-3.90	
26	MACHINERY /NO ELECT	9.03	26	HOTELS	-6.27	26	FOOD PROC.	-3.95	
27	OTHER TRANSPORTATION	6.70	27	RETAIL	-6.71	27	WHOLESALE	-4.40	
28	LEGAL SERVICES	5.55	28	ALL MANUF.	-7.37	28	BUS. SERV.	-5.04	
29	FOOD PROC.	5.49	29	FOOD PROC.	-7.72	29	ALL CONSTRUCTION	-5.96	
30	WHOLESALE	4.70	30	SERVICES	-8.85	30	PERS. SERVICES	-6.98	
31	ALL GOVT.	0.00	31	WHOLESALE	-10.32	31	RETAIL	-7.64	
32	STAT-LOCAL GOVT.	0.00	32	TRADE CONTRACTORS	-11.86	32	HEALTH SERVICES	-8.01	
33	FED. GOV.	0.00	33	FAB. METALS	-13.34	33	UTILITIES	-8.10	
34	FINAN. AUXILIARY	0.00	34	ALL CONSTRUCTION	-14.73	34	SERVICES	-10.41	
35	UTILITIES	-1.13	35	CHEMICALS	-16.29	35	PAPER PRODUCTS	-10.87	
36	PASS. TRANSPORTATION	-1.24	36	MISC. SERVICES	-16.53	36	BLD. CONSTRUCTION	-12.16	
37	ENTERTAINMENT	-4.70	37	INSTRUMENTS	-16.69	37	ALL MANUF.	-12.91	
38	CHEMICALS	-7.88	38	OTHER TRANSPORTATION	-19.30	38	PLAST-GLASS PRODUCTS	-13.86	
39	FAB. METALS	-9.04	39	TRANS SERVICES	-19.40	39	ENTERTAINMENT	-14.82	
40	TRADE CONTRACTORS	-9.76	40	BLD. CONSTRUCTION	-22.27	40	PRINTING	-16.58	
41	PRINTING	-10.17	41	PAPER PRODUCTS	-22.29	41	TRANS. AUXILIARY	-35.82	
42	MISC. SERVICES	-10.43	42	EDUC. SERVICES	-23.11	42	NONPROFIT ORGANIZ.	-38.42	
43	NONPROFIT ORGANIZ.	-12.11	43	ENTERTAINMENT	-24.41	43	OTHER TRANSPORTATION	-44.92	
44	TRANS. AUXILIARY	-14.74	44	PRINTING	-27.94	44	SECURITIES	-48.96	
45	WOOD PROD.	-16.01	45	MINING	-30.36	45	HOLDING COMPANIES	-49.31	
46	ALL CONSTRUCTION	-18.72	46	NONPROFIT ORGANIZ.	-32.69	46	MACHINERY /NO ELECT	-52.05	
47	PAPER PRODUCTS	-22.60	47	WOOD PROD.	-35.10	47	TEXTILES	-74.57	
48	BLD. CONSTRUCTION	-38.89	48	SECURITIES	-46.63	48	TRANS SERVICES	-91.76	
49	SECURITIES	-48.50	49	MACHINERY /NO ELECT	-48.40	49	EDUC. SERVICES	-98.72	
50	HOLDING COMPANIES	-50.57	50	HOLDING COMPANIES	-70.57	50	INSTRUMENTS	-112.16	
51	MINING	-59.47	51	TEXTILFS	-88.41	51	ELECT MACHINERY	-131.61	
52	TEXTILES	-63.53	52	TRANS. AUXILIARY	-109.42	52	SERVIC AUXILIARY	*****	
53	SERVIC AUXILIARY	*****	53	SERVIC AUXILIARY	*****	53	FINAN. AUXILIARY	*****	
54	MANUF. AUXILIARY	*****	54	MANUF. AUXILIARY	*****	54	MANUF. AUXILIARY	*****	
55	CONST. AUXILIARY	*****	55	CONST. AUXILIARY	*****	55	CONST. AUXILIARY	*****	

¹The score represents the competitive shift in percent.

Source: U.S. Department of Commerce, Bureau of Economic Analysis and McDonald & Greffe, Inc.

Table A-4

AN ILLUSTRATION OF WEIGHTED COMPETITIVE
SHIFT IN ECONOMIC ACTIVITY¹
ALAMEDA COUNTY 1965 - 1973

HEADQUARTERS SMSA-5				ANALYSIS BASED ON TOTAL EMPLOYMENT IN THE BASES				9-COUNTY BAY AREA			
RANK	INDUSTRY	WEIGHTED	SCORE	RANK	INDUSTRY	WEIGHTED	SCORE	RANK	INDUSTRY	WEIGHTED	SCORE
1	ALL MANUF.	8954.		1	SHIP, AIR CARGO	2694.		1	SHIP, AIR CARGO		2620.
2	ALL TRANSPORTATION	6203.		2	TRAN EQUIPMENT	1925.		2	ALL FINANCE		1242.
3	RETAIL	5417.		3	ALL FINANCE	1630.		3	TRAN EQUIPMENT		1193.
4	SERVICES	4987.		4	ALL TRANSPORTATION	1221.		4	FAB. METALS		551.
5	ALL FINANCE	4617.		5	COMMUN.	1129.		5	REAL ESTATE		516.
6	SHIP, AIR CARGO	3149.		6	RANKING	668.		6	ALL TRANSPORTATION		396.
7	HEALTH SERVICES	3062.		7	REAL ESTATE	619.		7	LEGAL SERVICES		395.
8	TRAN EQUIPMENT	2472.		8	AGRIC. SERVICES	305.		8	AGRIC. SERVICES		318.
9	REAL ESTATE	1376.		9	APPAREL	262.		9	PASS. TRANSPORTATION		320.
10	PERS. SERVICES	1233.		10	PASS. TRANSPORTATION	199.		10	PRIM METALS		296.
11	PLAST-GLASS PRODUCTS	1210.		11	MISC. MANUFACTURING	194.		11	INSURANCE		217.
12	PRIM METALS	1122.		12	INSURANCE	144.		12	APPAREL		202.
13	ELECT MACHINERY	1080.		13	PLAST-GLASS PRODUCTS	110.		13	MISC. MANUFACTURING		194.
14	BUS. SERV.	1027.		14	UTILITIES	116.		14	MINING		148.
15	WHOLESALE	1024.		15	LEGAL SERVICES	59.		15	PETROLEUM		67.
16	FOOD PROC.	721.		16	PETROLEUM	49.		16	ALL GOVT.		0.
17	MACHINERY /NO ELECT	685.		17	ELECT MACHINERY	3.		17	STAT-LOCAL GOVT.		0.
18	COMMUN.	645.		18	BUS. SERV.	1.		18	FED. GOV.		0.
19	OTHER TRANSPORTATION	598.		19	ALL GOVT.	0.		19	WOOD PROD.		-12.
20	BANKING	587.		20	STAT-LOCAL GOVT.	0.		20	HOTELS		-28.
21	APPAREL	526.		21	FED. GOV.	0.		21	CHEMICALS		-101.
22	EDUC. SERVICES	495.		22	FINAN. AUXILIARY	0.		22	BANKING		-101.
23	AGRIC. SERVICES	358.		23	TRANS SERVICES	-82.		23	COMMUN.		-105.
24	HOTELS	278.		24	HEALTH SERVICES	-107.		24	MISC. SERVICES		-110.
25	MISC. MANUFACTURING	198.		25	INSTRUMENTS	-110.		25	TRANS. AUXILIARY		-111.
26	TRANS SERVICES	186.		26	HOTELS	-145.		26	SECURITIES		-181.
27	INSURANCE	185.		27	SECURITIES	-172.		27	HOLDING COMPANIES		-213.
28	INSTRUMENTS	175.		28	PRIM METALS	-189.		28	UTILITIES		-227.
29	LEGAL SERVICES	51.		29	MINING	-277.		29	TRADE CONTRACTORS		-264.
30	PETROLEUM	50.		30	HOLDING COMPANIES	-304.		30	TEXTILES		-291.
31	ALL GOVT.	0.		31	TRANS. AUXILIARY	-339.		31	BUS. SERV.		-367.
32	STAT-LOCAL GOVT.	0.		32	TEXTILES	-345.		32	TRANS SERVICES		-389.
33	FED. GOV.	0.		33	EDUC. SERVICES	-426.		33	PAPER PRODUCTS		-398.
34	FINAN. AUXILIARY	0.		34	PERS. SERVICES	-429.		34	ENTERTAINMENT		-498.
35	PASS. TRANSPORTATION	-23.		35	MISC. SERVICES	-468.		35	FOOD PROC.		-518.
36	UTILITIES	-32.		36	CHEMICALS	-602.		36	PERS. SERVICES		-593.
37	TRANS. AUXILIARY	-46.		37	PAPER PRODUCTS	-817.		37	PLAST-GLASS PRODUCTS		-715.
38	ENTERTAINMENT	-158.		38	ENTERTAINMENT	-821.		38	BLD. CONSTRUCTION		-727.
39	SECURITIES	-179.		39	FOOD PROC.	-1014.		39	PRINTING		-761.
40	HOLDING COMPANIES	-218.		40	TRADE CONTRACTORS	-1173.		40	INSTRUMENTS		-795.
41	TEXTILES	-248.		41	WOOD PROD.	-1207.		41	WHOLESALE		-959.
42	MISC. SERVICES	-295.		42	FAB. METALS	-1221.		42	HEALTH SERVICES		-968.
43	CHEMICALS	-330.		43	PRINTING	-1283.		43	ALL CONSTRUCTION		-1178.
44	PRINTING	-467.		44	BLD. CONSTRUCTION	-1330.		44	NONPROFIT ORGANIZ.		-1813.
45	MINING	-542.		45	NONPROFIT ORGANIZ.	-1542.		45	EDUC. SERVICES		-1821.
46	NONPROFIT ORGANIZ.	-572.		46	OTHER TRANSPORTATION	-1722.		46	ELECT MACHINERY		-2830.
47	WOOD PROD.	-578.		47	WHOLESALE	-2247.		47	RETAIL		-3915.
48	FAB. METALS	-827.		48	ALL CONSTRUCTION	-2789.		48	MACHINERY /NO ELECT		-3947.
49	PAPER PRODUCTS	-828.		49	RETAIL	-3442.		49	OTHER TRANSPORTATION		-4008.
50	TRADE CONTRACTORS	-965.		50	MACHINERY /NO ELECT	-3669.		50	SERVICES		-4596.
51	BLD. CONSTRUCTION	-2323.		51	SERVICES	-3909.		51	ALL MANUF.		-9631.
52	ALL CONSTRUCTION	-3545.		52	ALL MANUF.	-5496.		52	SERVIC AUXILIARY		*****
53	SERVIC AUXILIARY	*****		53	SERVIC AUXILIARY	*****		53	FINAN. AUXILIARY		*****
54	MANUF. AUXILIARY	*****		54	MANUF. AUXILIARY	*****		54	MANUF. AUXILIARY		*****
55	CONST. AUXILIARY	*****		55	CONST. AUXILIARY	*****		55	CONST. AUXILIARY		*****

¹The score represents the competitive shift in percent multiplied by the 1965 sector employment.

Source: U.S. Department of Commerce, Bureau of Economic Analysis and McDonald & Grefe, Inc.

To provide an example, Tables A-3 and A-4 indicate the competitive shift experienced by Alameda County. Focusing on one sector, "Shipping and Air Cargo" (Sector 25), reveals a strong competitive advantage, compared to the employment growth experienced by the shipping and air cargo sectors in other metropolitan regions with a headquarters function. The size of this growth advantage is measured at 278.93 percent, which means actual employment growth in the county exceeded what would have occurred had that sector in Alameda grown consistent with the average experience of the headquarters SMSAs by an amount equal to 278.93 percent of the employment of that sector in Alameda in 1965. This sector ranked sixth in competitive advantage, however, when weighted by the 1963 base employment. This particular sector, employment growth in Alameda County, can be explained by the port and airport expansion.

The asterisks in Tables A-3 and A-4 indicate sectors where disclosure problems prevent the analysis from being carried out.

Unweighted and weighted comparisons of the competitive shift in economic activity of the nine-county Bay Area, the three-county BART District (and service area) and the San Francisco-Oakland SMSA are contained in Tables A-5 through A-10.

D. Data Characteristics of the Shift/Share Analysis

The primary source of data for the shift/share analysis was the U. S. Bureau of the Census County Business Patterns for 1965 and 1973. Employment is reported for two-digit standard industrial classifications by SMSA and by county. This report accounts for all the employment covered under the elective and nonelective provisions of the Federal Insurance Contributions Act.

The majority of the County Business Patterns employment estimates are tabulated from the Employers Quarterly Federal Tax Returns (Internal Revenue Service Form 941), but the U. S. Bureau of the Census devotes considerable effort to the problem of identifying the actual places of employment for multiestablishment firms. That is, since a multiestablishment firm may centralize payroll processing in one location (and may file its Form 941 centrally), additional steps are taken to identify employment by actual (rather than payroll) location. Firms with more than 50 employees and more than one place of employment are encouraged to participate in the Bureau's Establishment Reporting Plan and nonparticipating firms received a special multiunit survey. The results from the annual analysis for the County Business Patterns report are compared with the Census of Manufacturing performed every five years. This latter survey uses a questionnaire which deals explicitly with the physical location of employment.

Table A-5

THE COMPETITIVE SHIFT IN ECONOMIC ACTIVITY¹
NINE-COUNTY SAN FRANCISCO BAY AREA
1965 - 1973

HEADQUARTERS SMSA-S			WEST COAST SMSA-S		
RANK	INDUSTRY	SCORE	RANK	INDUSTRY	SCORE
1	FINAN. AUXILIARY	471.42	1	CONST. AUXILIARY	442.78
2	CONST. AUXILIARY	437.78	2	FINAN. AUXILIARY	415.93
3	SERVIC AUXILIARY	115.84	3	ELECT MACHINERY	61.18
4	ELECT MACHINERY	106.35	4	SERVIC AUXILIARY	39.14
5	INSTRUMENTS	67.42	5	INSTRUMENTS	29.07
6	MACHINERY /NO ELECT	60.50	6	BANKING	15.11
7	TRANS SERVICES	52.17	7	SECURITIES	11.71
8	EDUC. SERVICES	43.29	8	TRAN EQUIPMENT	11.52
9	APPAREL	36.13	9	EDUC. SERVICES	11.14
10	HEALTH SERVICES	33.37	10	HEALTH SERVICES	7.13
11	SHIP, AIR CARGO	29.16	11	APPAREL	6.73
12	ALL TRANSPORTATION	27.38	12	NONPROFIT ORGANIZ.	5.74
13	NONPROFIT ORGANIZ.	26.31	13	ALL MANUF.	5.54
14	ALL MANUF.	24.92	14	BUS. SERV.	5.05
15	REAL ESTATE	23.35	15	ALL TRANSPORTATION	3.89
16	PERS. SERVICES	22.33	16	MACHINERY /NO ELECT	3.07
17	ALL FINANCE	22.26	17	REAL ESTATE	2.80
18	SERVICES	21.70	18	PERS. SERVICES	2.77
19	TRANS. AUXILIARY	21.09	19	ALL FINANCE	2.61
20	OTHER TRANSPORTATION	20.17	20	SERVICES	1.56
21	BUS. SERV.	19.12	21	RETAIL	.92
22	RETAIL	18.20	22	MISC. MANUFACTURING	.52
23	TRAN EQUIPMENT	17.38	23	STAT-LOCAL GOVT.	-1.04
24	SECURITIES	14.30	24	OTHER TRANSPORTATION	-1.74
25	BANKING	13.51	25	TRANS SERVICES	-3.21
26	HOTELS	13.23	26	FOOD PROC.	-3.77
27	TEXTILES	11.03	27	HOTELS	-5.06
28	PLAST-GLASS PRODUCTS	10.26	28	WHOLESALE	-5.92
29	FOOD PROC.	9.44	29	AGRIC. SERVICES	-6.60
30	WHOLESALE	9.11	30	ALL GOVT.	-6.79
31	ENTERTAINMENT	8.19	31	PASS. TRANSPORTATION	-6.99
32	MISC. MANUFACTURING	7.36	32	INSURANCE	-7.33
33	PRINTING	6.41	33	PLAST-GLASS PRODUCTS	-7.67
34	AGRIC. SERVICES	3.95	34	ALL CONSTRUCTION	-8.77
35	HOLDING COMPANIES	-1.27	35	TRADE CONTRACTORS	-9.19
36	INSURANCE	-3.22	36	BLD. CONSTRUCTION	-10.11
37	ALL GOVT.	-4.80	37	SHIP, AIR CARGO	-11.14
38	CHEMICALS	-5.48	38	PETROLEUM	-11.35
39	MISC. SERVICES	-6.53	39	PRINTING	-11.36
40	TRADE CONTRACTORS	-7.09	40	PAPER PRODUCTS	-11.42
41	FED. GOV.	-8.57	41	ENTERTAINMENT	-11.51
42	PETROLEUM	-10.67	42	FED. GOV.	-11.87
43	PAPER PRODUCTS	-11.73	43	MISC. SERVICES	-12.63
44	ALL CONSTRUCTION	-12.77	44	TEXTILES	-13.85
45	FAB. METALS	-15.06	45	CHEMICALS	-13.89
46	WOOD PROD.	-17.98	46	FAB. METALS	-19.37
47	PASS. TRANSPORTATION	-19.08	47	HOLDING COMPANIES	-21.26
48	BLD. CONSTRUCTION	-26.73	48	WOOD PROD.	-36.26
49	LEGAL SERVICES	-37.17	49	LEGAL SERVICES	-36.33
50	STAT-LOCAL GOVT.	-49.12	50	TRANS. AUXILIARY	-73.60
51	UTILITIES	*****	51	UTILITIES	*****
52	MANUF. AUXILIARY	*****	52	MANUF. AUXILIARY	*****
53	COMMUN.	*****	53	COMMUN.	*****
54	PRIM METALS	*****	54	PRIM METALS	*****
55	MINING	*****	55	MINING	*****

¹The score represents the competitive shift in percent.

Source: U.S. Department of Commerce, Bureau of Economic Analysis and McDonald & Greffe, Inc.

Table A-6

THE WEIGHTED COMPETITIVE SHIFT IN ECONOMIC ACTIVITY¹
 NINE-COUNTY SAN FRANCISCO BAY AREA
 1965 - 1973

HEADQUARTERS SMSA-S			WEST COAST SMSA-S		
RANK	INDUSTRY	WEIGHTED SCORE	RANK	INDUSTRY	WEIGHTED SCORE
1	ALL MANUF.	72481.	1	ELECT MACHINERY	21138.
2	SERVICES	45636.	2	ALL MANUF.	16125.
3	RETAIL	38704.	3	BANKING	5341.
4	ELECT MACHINERY	36747.	4	ALL TRANSPORTATION	4088.
5	ALL TRANSPORTATION	28768.	5	HEALTH SERVICES	3309.
6	ALL FINANCE	21359.	6	SERVICES	3271.
7	HEALTH SERVICES	15493.	7	ALL FINANCE	2507.
8	MACHINERY /NO ELECT	13868.	8	TRAN EQUIPMENT	2181.
9	WHOLESALE	8229.	9	BUS. SERV.	1973.
10	PERS. SERVICES	8018.	10	RETAIL	1962.
11	SHIP, AIR CARGO	7738.	11	EDUC. SERVICES	1667.
12	BUS. SERV.	7464.	12	CONST. AUXILIARY	1510.
13	EDUC. SERVICES	6478.	13	INSTRUMENTS	1135.
14	NONPROFIT ORGANIZ.	5108.	14	NONPROFIT ORGANIZ.	1114.
15	BANKING	4776.	15	PERS. SERVICES	994.
16	OTHER TRANSPORTATION	4341.	16	MACHINERY /NO ELECT	704.
17	REAL ESTATE	4102.	17	APPAREL	576.
18	FOOD PROC.	3885.	18	REAL ESTATE	491.
19	TRAN EQUIPMENT	3290.	19	SECURITIES	476.
20	APPAREL	3091.	20	FINAN. AUXILIARY	453.
21	INSTRUMENTS	2632.	21	SERVIC AUXILIARY	321.
22	MISC. MANUFACTURING	2269.	22	MISC. MANUFACTURING	162.
23	HOTELS	2198.	23	TEXTILES	-92.
24	TRANS SERVICES	1736.	24	TRANS SERVICES	-107.
25	PRINTING	1542.	25	AGRIC. SERVICES	-241.
26	CONST. AUXILIARY	1493.	26	HOLDING COMPANIES	-365.
27	PLAST-GLASS PRODUCTS	1366.	27	OTHER TRANSPORTATION	-373.
28	ENTERTAINMENT	1165.	28	TRANS. AUXILIARY	-565.
29	SERVIC AUXILIARY	949.	29	PETROLEUM	-663.
30	SECURITIES	581.	30	PASS. TRANSPORTATION	-717.
31	FINAN. AUXILIARY	514.	31	HOTELS	-841.
32	TRANS. AUXILIARY	162.	32	PLAST-GLASS PRODUCTS	-1021.
33	AGRIC. SERVICES	144.	33	PAPER PRODUCTS	-1197.
34	TEXTILES	74.	34	FOOD PROC.	-1552.
35	HOLDING COMPANIES	-22.	35	ENTERTAINMENT	-1636.
36	PETROLEUM	-624.	36	CHEMICALS	-1817.
37	CHEMICALS	-717.	37	MISC. SERVICES	-2172.
38	MISC. SERVICES	-1122.	38	STAT-LOCAL GOVT.	-2177.
39	INSURANCE	-1197.	39	BLD. CONSTRUCTION	-2677.
40	PAPER PRODUCTS	-1230.	40	INSURANCE	-2726.
41	WOOD PROD.	-1721.	41	PRINTING	-2736.
42	PASS. TRANSPORTATION	-1957.	42	LEGAL SERVICES	-2813.
43	LEGAL SERVICES	-2879.	43	SHIP, AIR CARGO	-2957.
44	TRADE CONTRACTORS	-2979.	44	WOOD PROD.	-3471.
45	FAB. METALS	-3306.	45	TRADE CONTRACTORS	-3863.
46	BLD. CONSTRUCTION	-7080.	46	FAB. METALS	-4251.
47	FED. GOV.	-7786.	47	WHOLESALE	-5349.
48	ALL CONSTRUCTION	-10902.	48	ALL CONSTRUCTION	-7490.
49	ALL GOVT.	-14363.	49	FED. GOV.	-10786.
50	STAT-LOCAL GOVT.	-102424.	50	ALL GOVT.	-20333.
51	UTILITIES	*****	51	UTILITIES	*****
52	MANUF. AUXILIARY	*****	52	MANUF. AUXILIARY	*****
53	COMMUN.	*****	53	COMMUN.	*****
54	PRIM METALS	*****	54	PRIM METALS	*****
55	MINING	*****	55	MINING	*****

¹ The score represents the competitive shift in percent multiplied by the 1965 sector employment.

Source: U.S. Department of Commerce, Bureau of Economic Analysis and McDonald & Greffe, Inc.

Table A-7

THE COMPETITIVE SHIFT IN ECONOMIC ACTIVITY¹
THREE-COUNTY BART DISTRICT
1965 - 1973

HEADQUARTERS SMSA-S			WEST COAST SMSA-S			9-COUNTY BAY AREA		
RANK	INDUSTRY	SCORE	RANK	INDUSTRY	SCORE	RANK	INDUSTRY	SCORE
1	FINAN. AUXILIARY	750.14	1	FINAN. AUXILIARY	694.65	1	FINAN. AUXILIARY	270.72
2	CONST. AUXILIARY	307.53	2	CONST. AUXILIARY	312.53	2	STAT-LOCAL GOVT.	83.36
3	SERVIC. AUXILIARY	140.61	3	STAT-LOCAL GOVT.	79.32	3	ALL GOVT.	44.37
4	EDUC. SERVICES	65.06	4	SERVIC. AUXILIARY	63.92	4	MISC. MANUFACTURING	43.55
5	ELECT. MACHINERY	63.84	5	MISC. MANUFACTURING	44.07	5	LEGAL SERVICES	41.35
6	MISC. MANUFACTURING	50.91	6	ALL GOVT.	37.58	6	SERVIC. AUXILIARY	24.78
7	ALL GOVT.	39.57	7	EDUC. SERVICES	32.91	7	EDUC. SERVICES	21.77
8	APPAREL	38.93	8	ELECT. MACHINERY	18.64	8	MINING	18.33
9	STAT-LOCAL GOVT.	31.24	9	BANKING	13.78	9	AGRIC. SERVICES	6.34
10	HEALTH SERVICES	22.27	10	TRAN. EQUIPMENT	13.23	10	FED. GOV.	5.75
11	SHIP, AIR CARGO	21.65	11	APPAREL	9.50	11	MISC. SERVICES	4.31
12	REAL ESTATE	21.76	12	SECURITIES	5.98	12	WOOD PROD.	3.59
13	TRANS. SERVICES	21.17	13	LEGAL SERVICES	5.02	13	APPAREL	2.77
14	ALL TRANSPORTATION	19.52	14	BUS. SERV.	3.79	14	TRAN. EQUIPMENT	1.71
15	TRAN. EQUIPMENT	19.09	15	REAL ESTATE	.70	15	TEXTILES	1.60
16	BUS. SERV.	17.86	16	AGRIC. SERVICES	-.26	16	FAB. METALS	1.56
17	ALL FINANCE	17.30	17	ALL FINANCE	-2.34	17	PETROLEUM	-.45
18	SERVICES	15.17	18	ALL TRANSPORTATION	-3.06	18	BUS. SERV.	-1.26
19	NONPROFIT ORGANIZ.	14.55	19	HEALTH SERVICES	-3.97	19	BANKING	-1.34
20	PERS. SERVICES	13.16	20	SERVICES	-4.97	20	PASS. TRANSPORTATION	-1.49
21	TEXTILES	12.63	21	NONPROFIT ORGANIZ.	-6.03	21	REAL ESTATE	-2.09
22	BANKING	12.18	22	FED. GOV.	-6.12	22	ENTERTAINMENT	-3.25
23	AGRIC. SERVICES	10.30	23	PERS. SERVICES	-6.39	23	ALL FINANCE	-4.96
24	INSTRUMENTS	10.23	24	MISC. SERVICES	-8.32	24	ALL CONSTRUCTION	-5.30
25	SECURITIES	8.57	25	PASS. TRANSPORTATION	-8.47	25	SECURITIES	-5.73
26	OTHER TRANSPORTATION	8.29	26	PETROLEUM	-11.00	26	SERVICES	-6.53
27	PRIM. METALS	6.85	27	TEXTILES	-12.25	27	SHIP, AIR CARGO	-7.50
28	MACHINERY /NO ELECT	5.69	28	RETAIL	-12.43	28	ALL TRANSPORTATION	-7.85
29	ALL MANUF.	5.30	29	HOTELS	-13.04	29	HOTELS	-7.98
30	HOTELS	5.25	30	OTHER TRANSPORTATION	-13.62	30	PERS. SERVICES	-9.16
31	ENTERTAINMENT	4.95	31	FOOD PROD.	-13.92	31	INSURANCE	-9.77
32	RETAIL	4.85	32	ALL MANUF.	-14.07	32	HOLDING COMPANIES	-9.97
33	LEGAL SERVICES	4.18	33	ALL CONSTRUCTION	-14.07	33	FOOD PROD.	-10.15
34	FOOD PROD.	-.71	34	ENTERTAINMENT	-14.76	34	PRIM. METALS	-11.05
35	PLAST-GLASS PRODUCTS	-1.92	35	INSURANCE	-17.10	35	HEALTH SERVICES	-11.10
36	MISC. SERVICES	-2.22	36	FAB. METALS	-17.82	36	NONPROFIT ORGANIZ.	-11.76
37	FED. GOV.	-2.42	37	SHIP, AIR CARGO	-18.65	37	OTHER TRANSPORTATION	-11.88
38	WHOLESALE	-6.02	38	PLAST-GLASS PRODUCTS	-19.85	38	PLAST-GLASS PRODUCTS	-12.18
39	PRINTING	-7.62	39	WHOLESALE	-21.05	39	TRADE CONTRACTORS	-12.23
40	PETROLEUM	-11.13	40	TRADE CONTRACTORS	-21.43	40	RETAIL	-13.35
41	HOLDING COMPANIES	-11.24	41	PRIM. METALS	-21.55	41	PAPER PRODUCTS	-13.77
42	INSURANCE	-12.99	42	PAPER PRODUCTS	-25.19	42	PRINTING	-14.03
43	FAB. METALS	-13.51	43	PRINTING	-25.39	43	CHEMICALS	-14.13
44	WOOD PROD.	-14.39	44	CHEMICALS	-20.02	44	WHOLESALE	-15.13
45	ALL CONSTRUCTION	-18.07	45	INSTRUMENTS	-28.12	45	BLD. CONSTRUCTION	-18.26
46	TRADE CONTRACTORS	-19.37	46	MINING	-28.23	46	ALL MANUF.	-19.61
47	CHEMICALS	-19.61	47	BLD. CONSTRUCTION	-28.37	47	TRANS. SERVICES	-31.01
48	PASS. TRANSPORTATION	-20.56	48	HOLDING COMPANIES	-31.24	48	ELECT. MACHINERY	-42.51
49	PAPER PRODUCTS	-25.50	49	WOOD PROD.	-32.67	49	MACHINERY /NO ELECT	-54.81
50	MANUF. AUXILIARY	-29.30	50	TRANS. SERVICES	-34.22	50	INSTRUMENTS	-57.19
51	BLD. CONSTRUCTION	-44.99	51	MACHINERY /NO ELECT	-51.74	51	CONST. AUXILIARY	-130.25
52	MINING	-57.33	52	MANUF. AUXILIARY	-72.72	52	MANUF. AUXILIARY	-140.88
53	UTILITIES	*****	53	UTILITIES	*****	53	UTILITIES	*****
54	TRANS. AUXILIARY	*****	54	TRANS. AUXILIARY	*****	54	TRANS. AUXILIARY	*****
55	COMMUN.	*****	55	COMMUN.	*****	55	COMMUN.	*****

¹The score represents the competitive shift in percent.

Source: U.S. Department of Commerce, Bureau of Economic Analysis and McDonald & Grefe, Inc.

Table A-8

THE WEIGHTED COMPETITIVE SHIFT IN ECONOMIC ACTIVITY¹
THREE-COUNTY BART DISTRICT
1965 - 1973

HEADQUARTERS SMSA-S			WEST COAST SMSA-S			9-COUNTY BAY AREA		
RANK	INDUSTRY	WEIGHTED SCORE	RANK	INDUSTRY	WEIGHTED SCORE	RANK	INDUSTRY	WEIGHTED SCORE
1	ALL GOVT.	54570.	1	STAT-LOCAL GOVT.	62729.	1	STAT-LOCAL GOVT.	63555.
2	STAT-LOCAL GOVT.	24704.	2	ALL GOVT.	51820.	2	ALL GOVT.	61186.
3	SERVICES	19573.	3	BANKING	3591.	3	FED. GOV.	3372.
4	ALL TRANSPORTATION	13756.	4	EDUC. SERVICES	1662.	4	LEGAL SERVICES	1737.
5	ALL FINANCE	12406.	5	TRAN EQUIPMENT	1565.	5	EDUC. SERVICES	1999.
6	ALL MANUF.	8457.	6	BUS. SERV.	899.	6	MISC. MANUFACTURING	627.
7	HEALTH SERVICES	6125.	7	CONST. AUXILIARY	884.	7	MISC. SERVICES	444.
8	RETAIL	6036.	8	ELECT MACHINERY	841.	8	MINING	327.
9	BUS. SERV.	4235.	9	APPAREL	740.	9	FAB. METALS	251.
10	EDUC. SERVICES	3285.	10	MISC. MANUFACTURING	634.	10	APPAREL	216.
11	BANKING	3174.	11	SERVIC AUXILIARY	376.	11	TRAN EQUIPMENT	202.
12	APPAREL	3030.	12	FINAN. AUXILIARY	347.	12	WOOD PROD.	194.
13	ELECT MACHINERY	2876.	13	SECURITIES	217.	13	SERVIC AUXILIARY	146.
14	PERS. SERVICES	2863.	14	LEGAL SERVICES	211.	14	FINAN. AUXILIARY	139.
15	SHIP, AIR CARGO	2694.	15	REAL ESTATE	77.	15	AGRIC. SERVICES	88.
16	REAL ESTATE	2337.	16	AGRIC. SERVICES	-4.	16	TEXTILES	9.
17	TRAN EQUIPMENT	2259.	17	TEXTILES	-70.	17	PETROLEUM	-26.
18	NONPROFIT ORGANIZ.	2118.	18	HOLDING COMPANIES	-459.	18	PASS. TRANSPORTATION	-128.
19	OTHER TRANSPORTATION	1345.	19	MINING	-504.	19	HOLDING COMPANIES	-147.
20	CONST. AUXILIARY	879.	20	INSTRUMENTS	-526.	20	SECURITIES	-208.
21	SERVIC AUXILIARY	828.	21	PETROLEUM	-669.	21	REAL ESTATE	-230.
22	MISC. MANUFACTURING	733.	22	PASS. TRANSPORTATION	-711.	22	ENTERTAINMENT	-292.
23	HOTELS	638.	23	MISC. SERVICES	-857.	23	BUS. SERV.	-299.
24	TRANS SERVICES	628.	24	NONPROFIT ORGANIZ.	-877.	24	BANKING	-348.
25	PRIM METALS	620.	25	TRANS SERVICES	-1016.	25	CONST. AUXILIARY	-369.
26	MACHINERY /NO ELECT	603.	26	HEALTH SERVICES	-1092.	26	TRANS SERVICES	-920.
27	ENTERTAINMENT	446.	27	ENTERTAINMENT	-1330.	27	SHIP, AIR CARGO	-933.
28	FINAN. AUXILIARY	375.	28	PERS. SERVICES	-1391.	28	PAPER PRODUCTS	-968.
29	SECURITIES	310.	29	HOTELS	-1585.	29	HOTELS	-970.
30	INSTRUMENTS	191.	30	ALL FINANCE	-1680.	30	PRIM METALS	-1001.
31	LEGAL SERVICES	175.	31	PLAST-GLASS PRODUCTS	-1717.	31	PLAST-GLASS PRODUCTS	-1053.
32	AGRIC. SERVICES	143.	32	WOOD PROD.	-1762.	32	INSTRUMENTS	-1070.
33	TEXTILES	72.	33	PAPER PRODUCTS	-1771.	33	CHEMICALS	-1298.
34	HOLDING COMPANIES	-165.	34	PRIM METALS	-1952.	34	NONPROFIT ORGANIZ.	-1712.
35	PLAST-GLASS PRODUCTS	-166.	35	OTHER TRANSPORTATION	-2210.	35	ELECT MACHINERY	-1915.
36	WOOD PROD.	-188.	36	SHIP, AIR CARGO	-2320.	36	OTHER TRANSPORTATION	-1928.
37	MISC. SERVICES	-228.	37	CHEMICALS	-2514.	37	PERS. SERVICES	-1993.
38	PETROLEUM	-630.	38	ALL TRANSPORTATION	-2792.	38	INSURANCE	-2438.
39	WOOD PROD.	-776.	39	FAB. METALS	-2871.	39	PRINTING	-2452.
40	MINING	-1023.	40	FED. GOV.	-3592.	40	BLD. CONSTRUCTION	-2635.
41	PRINTING	-1332.	41	WOOD PROD.	-3668.	41	ALL CONSTRUCTION	-2659.
42	FED. GOV.	-1655.	42	BLD. CONSTRUCTION	-4093.	42	WOOD PROD.	-2675.
43	PASS. TRANSPORTATION	1773.	43	INSURANCE	-4266.	43	HEALTH SERVICES	-3052.
44	PAPER PRODUCTS	-1793.	44	PRINTING	-4437.	44	TRADE CONTRACTORS	-3131.
45	CHEMICALS	-1802.	45	TRADE CONTRACTORS	-5483.	45	ALL FINANCE	-3554.
46	FAB. METALS	-2177.	46	MACHINERY /NO ELECT	-5484.	46	ALL TRANSPORTATION	-5534.
47	INSURANCE	-3241.	47	SERVICES	-6415.	47	MACHINERY /NO ELECT	-5809.
48	WHOLESALE	-4080.	48	ALL CONSTRUCTION	-7056.	48	SERVICES	-8422.
49	TRADE CONTRACTORS	-4945.	49	MANUF. AUXILIARY	-12330.	49	WHOLESALE	-10254.
50	MANUF. AUXILIARY	-4955.	50	WHOLESALE	-14266.	50	RETAIL	-16634.
51	BLD. CONSTRUCTION	-6492.	51	RETAIL	-15484.	51	MANUF. AUXILIARY	-25180.
52	ALL CONSTRUCTION	-9059.	52	ALL MANUF.	-22124.	52	ALL MANUF.	-31266.
53	UTILITIES	*****	53	UTILITIES	*****	53	UTILITIES	*****
54	TRANS. AUXILIARY	*****	54	TRANS. AUXILIARY	*****	54	TRANS. AUXILIARY	*****
55	COMMUN.	*****	55	COMMUN.	*****	55	COMMUN.	*****

¹The score represents the competitive shift in percent multiplied by the 1965 sector employment.

Source: U.S. Department of Commerce, Bureau of Economic Analysis and McDonald & Greffe, Inc.

Table A-9

THE COMPETITIVE SHIFT IN ECONOMIC ACTIVITY¹
 SAN FRANCISCO-OAKLAND SMSA
 1965 - 1973

HEADQUARTERS SMSA-S			WEST COAST SMSA-S		
RANK	INDUSTRY	SCORE	RANK	INDUSTRY	SCORE
1	FINAN. AUXILIARY	471.42	1	CONST. AUXILIARY	442.78
2	CONST. AUXILIARY	437.78	2	FINAN. AUXILIARY	415.93
3	SERVIC AUXILIARY	132.16	3	MANUF. AUXILIARY	62.19
4	MANUF. AUXILIARY	105.61	4	EDUC. SERVICES	56.52
5	EDUC. SERVICES	88.67	5	SERVIC AUXILIARY	55.47
6	MISC. MANUFACTURING	54.29	6	MISC. MANUFACTURING	47.45
7	TRANS SERVICES	45.41	7	MISC. SERVICES	18.60
8	APPAREL	38.90	8	COMMUN.	16.01
9	SHIP, AIR CARGO	29.51	9	BANKING	15.95
10	MISC. SERVICES	24.70	10	APPAREL	9.50
11	ALL TRANSPORTATION	24.47	11	UTILITIES	8.60
12	HEALTH SERVICES	23.34	12	SECURITIES	7.77
13	TRANS. AUXILIARY	21.09	13	TRAN EQUIPMENT	1.79
14	ALL FINANCE	20.36	14	ALL TRANSPORTATION	.98
15	NONPROFIT ORGANIZ.	18.67	15	ALL FINANCE	.71
16	SERVICES	18.42	16	BUS. SERV.	.46
17	REAL ESTATE	17.80	17	SERVICES	-1.73
18	PRIM METALS	17.06	18	AGRIC. SERVICES	-1.83
19	PERS. SERVICES	16.80	19	NONPROFIT ORGANIZ.	-1.90
20	INSTRUMENTS	15.64	20	REAL ESTATE	-2.76
21	BUS. SERV.	14.53	21	PERS. SERVICES	-2.76
22	BANKING	14.35	22	HEALTH SERVICES	-2.90
23	ELECT MACHINERY	13.26	23	RETAIL	-6.80
24	OTHER TRANSPORTATION	12.74	24	STAT-LOCAL GOVT.	-8.30
25	ENTERTAINMENT	11.34	25	ENTERTAINMENT	-8.36
26	TEXTILES	11.03	26	INSURANCE	-8.52
27	RETAIL	10.48	27	HOTELS	-8.53
28	SECURITIES	10.36	28	OTHER TRANSPORTATION	-9.17
29	HOTELS	9.76	29	PASS. TRANSPORTATION	-9.75
30	MACHINERY /NO ELECT	9.52	30	TRANS SERVICES	-9.97
31	AGRIC. SERVICES	8.73	31	BLD. CONSTRUCTION	-10.09
32	TRAN EQUIPMENT	7.65	32	SHIP, AIR CARGO	-10.79
33	COMMUN.	7.35	33	FED. GOV.	-10.88
34	ALL MANUF.	5.65	34	PETROLEUM	-11.02
35	HOLDING COMPANIES	4.66	35	PRIM METALS	-11.34
36	UTILITIES	3.32	36	ALL GOVT.	-11.70
37	PRINTING	2.11	37	FOOD PROC.	-11.71
38	WHOLESALE	2.06	38	ALL CONSTRUCTION	-12.48
39	FOOD PROC.	1.50	39	WHOLESALE	-12.97
40	PLAST-GLASS PRODUCTS	.49	40	ALL MANUF.	-13.72
41	INSURANCE	-4.41	41	TEXTILES	-13.85
42	FED. GOV.	-7.58	42	PAPER PRODUCTS	-14.82
43	CHEMICALS	-8.96	43	HOLDING COMPANIES	-15.34
44	ALL GOVT.	-9.71	44	PRINTING	-15.66
45	PETROLEUM	-10.34	45	CHEMICALS	-17.37
46	PAPER PRODUCTS	-15.13	46	PLAST-GLASS PRODUCTS	-17.45
47	TRADE CONTRACTORS	-16.01	47	TRADE CONTRACTORS	-18.12
48	ALL CONSTRUCTION	-16.47	48	INSTRUMENTS	-22.70
49	WOOD PROD.	-17.00	49	FAB. METALS	-25.67
50	FAB. METALS	-21.36	50	ELECT MACHINERY	-31.91
51	PASS. TRANSPORTATION	-21.81	51	WOOD PROD.	-35.28
52	BLD. CONSTRUCTION	-26.71	52	LEGAL SERVICES	-46.43
53	LEGAL SERVICES	-47.27	53	MACHINERY /NO ELECT	-47.91
54	STAT-LOCAL GOVT.	-56.38	54	TRANS. AUXILIARY	-73.60
55	MINING	*****	55	MINING	*****

¹The score represents the competitive shift in percent.

Source: U.S. Department of Commerce, Bureau of Economic Analysis and McDonald & Grefe, Inc.

Table A-10

THE WEIGHTED COMPETITIVE SHIFT IN ECONOMIC ACTIVITY¹
 SAN FRANCISCO-OAKLAND SMSA
 1965 - 1973

HEADQUARTERS SMSA-S			WEST COAST SMSA-S		
RANK	INDUSTRY	WEIGHTED SCORE	RANK	INDUSTRY	WEIGHTED SCORE
1	SERVICES	28440.	1	MANUF. AUXILIARY	5715.
2	ALL TRANSPORTATION	21894.	2	BANKING	4588.
3	RETAIL	16285.	3	EDUC. SERVICES	3842.
4	ALL FINANCE	16269.	4	COMMUN.	3476.
5	ALL MANUF.	10876.	5	MISC. SERVICES	2157.
6	MANUF. AUXILIARY	9707.	6	MISC. MANUFACTURING	1525.
7	HEALTH SERVICES	7656.	7	CONST. AUXILIARY	1510.
8	SHIP, AIR CARGO	7460.	8	UTILITIES	1022.
9	EDUC. SERVICES	6027.	9	ALL TRANSPORTATION	876.
10	PERS. SERVICES	4551.	10	APPAREL	769.
11	BUS. SERV.	4310.	11	ALL FINANCE	566.
12	BANKING	4128.	12	FINAN. AUXILIARY	453.
13	APPAREL	3149.	13	SERVIC AUXILIARY	412.
14	NONPROFIT ORGANIZ.	3021.	14	SECURITIES	287.
15	MISC. SERVICES	2865.	15	TRAN EQUIPMENT	249.
16	REAL ESTATE	2493.	16	BUS. SERV.	138.
17	OTHER TRANSPORTATION	2200.	17	AGRIC. SERVICES	-42.
18	ELECT MACHINERY	2049.	18	TEXTILES	-92.
19	PRIM METALS	2022.	19	HOLDING COMPANIES	-237.
20	MISC. MANUFACTURING	1745.	20	TRANS SERVICES	-306.
21	WHOLESALE	1619.	21	NONPROFIT ORGANIZ.	-308.
22	COMMUN.	1595.	22	REAL ESTATE	-386.
23	CONST. AUXILIARY	1493.	23	TRANS. AUXILIARY	-565.
24	TRANS SERVICES	1394.	24	INSTRUMENTS	-567.
25	HOTELS	1341.	25	PETROLEUM	-631.
26	ENTERTAINMENT	1250.	26	PERS. SERVICES	-748.
27	MACHINERY /NO ELECT	1193.	27	PASS. TRANSPORTATION	-912.
28	TRAN EQUIPMENT	1067.	28	ENTERTAINMENT	-921.
29	SERVIC AUXILIARY	981.	29	HEALTH SERVICES	-952.
30	FINAN. AUXILIARY	514.	30	HOTELS	-1172.
31	FOOD PROC.	436.	31	PAPER PRODUCTS	-1226.
32	PRINTING	412.	32	PRIM METALS	-1344.
33	UTILITIES	395.	33	OTHER TRANSPORTATION	-1584.
34	INSTRUMENTS	391.	34	PLAST-GLASS PRODUCTS	-1708.
35	SECURITIES	383.	35	BLD. CONSTRUCTION	-1942.
36	AGRIC. SERVICES	201.	36	CHEMICALS	-2020.
37	TRANS. AUXILIARY	162.	37	WOOD PROD.	-2293.
38	TEXTILES	74.	38	SERVICES	-2664.
39	HOLDING COMPANIES	72.	39	INSURANCE	-2707.
40	PLAST-GLASS PRODUCTS	48.	40	SHIP, AIR CARGO	-2727.
41	PETROLEUM	-592.	41	PRINTING	-3050.
42	CHEMICALS	-1042.	42	LEGAL SERVICES	-3156.
43	WOOD PROD.	-1105.	43	FOOD PROC.	-3409.
44	PAPER PRODUCTS	-1251.	44	ELECT MACHINERY	-4931.
45	INSURANCE	-1402.	45	FAB. METALS	-4992.
46	PASS. TRANSPORTATION	-2043.	46	TRADE CONTRACTORS	-5677.
47	LEGAL SERVICES	-3213.	47	MACHINERY /NO ELECT	-6003.
48	FAB. METALS	-4154.	48	FED. GOV.	-7432.
49	TRADE CONTRACTORS	-5018.	49	ALL CONSTRUCTION	-8019.
50	BLD. CONSTRUCTION	-5140.	50	WHOLESALE	-10204.
51	FED. GOV.	-5178.	51	RETAIL	-10568.
52	ALL CONSTRUCTION	-10587.	52	STAT-LOCAL GOVT.	-12683.
53	ALL GOVT.	-21478.	53	ALL GOVT.	-25889.
54	STAT-LOCAL GOVT.	-86197.	54	ALL MANUF.	-26396.
55	MINING	*****	55	MINING	*****

¹The score represents the competitive shift in percent multiplied by the 1965 sector employment.

Source: U.S. Department of Commerce, Bureau of Economic Analysis and McDonald & Greffe, Inc.

Employment of the following types is not covered by the County Business Patterns report: government workers, self-employed persons, railroad employees, farm workers, domestic workers and employees on oceangoing vessels.

Because of the incompleteness of the County Business Patterns report, it was necessary to supplement that report with data from other public agencies. This unavoidably introduces differences and minor incompatibilities, such as:

- The same firm may be grouped into a different SIC classification by the collecting agency; or
- The criteria used for distinguishing among establishments and reporting units for multiplant firms may differ among collecting agencies. For example, the County Business Patterns report tabulates manufacturing firms by establishment and all other firms by reporting unit within each county, while the California Employment Development and the U. S. Bureau of Labor Statistics collect all data by reporting unit.

The major secondary source for employment data was the State of California Employment Development Department (EDD), California Employment and Payrolls, Report 127, January-March, 1965, 1973, First Quarter Employment.

California EDD Report 127 provided employment totals by two-digit SICs for various California SMSAs and county regions. For the shift/share analysis, this data source was used only to fill in disclosure gaps in the County Business Patterns data. The mid-March pay period employment totals in the California State EDD Report 127 are derived from the quarterly reports of all private firms and government entities reporting unemployment insurance, disability insurance or personal income tax withholding.

Discrepancies between the County Business Patterns report and EDD Report 127 employment estimates may arise from differences in coverage, firm classification or reporting unit systems, as discussed previously. In order to minimize potential error due to inconsistencies and data collection among agencies where EDD data were used to fill in disclosure gaps, employment totals from the same agency were used in both years for that industry.

The source of data on federal, state and local government employment in 1965 and 1973 is a publication of the U. S. Bureau of Labor Statistics.¹ Data in this report are assembled from

¹U. S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings, States and Areas, 1939-1974, Bulletin No. 1370-11, 1975.

records that were submitted voluntarily to the State employment agency (e.g., the California Employment Development Department) by a sample of industrial, commercial and government establishments employing collectively approximately 30 million workers. These data are then assembled and published by the Bureau of Labor Statistics.

APPENDIX B
EMPLOYMENT BY INDUSTRY GROUP

APPENDIX B

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Table B-1

EMPLOYMENT BY INDUSTRY GROUP
ALAMEDA COUNTY
1965 - 1973

SECTOR DESCRIPTION	1965 EMPLOYMENT	1973 EMPLOYMENT	*	SECTOR DESCRIPTION	1965 EMPLOYMENT	1973 EMPLOYMENT
1 AGRIC. SFP	500.	1056.	*	34 REAL ESTAT	2680.	6519.
2 MINING	912.	563.	*	35 HOLDING CO	431.	467.
3 ALL CONSTR	19921.	16298.	*	36 ALL FINANC	15158.	22454.
4 BLDG. CONST	5973.	4890.	*	37 HOTELS	2312.	3023.
5 TRADE CONT	9886.	8868.	*	38 BUS. SERV.	7269.	11773.
6 ALL MANUF.	74590.	79273.	*	39 PERS. SERV	8495.	8553.
7 FOOD PROC.	13131.	11251.	*	40 ENTERTAINM	3364.	3839.
8 TEXTILES	390.	164.	*	41 HEALTH SER	12074.	21058.
9 APPAREL	896.	1419.	*	42 LOCAL SERV	924.	1547.
10 WOOD PROD.	3438.	3120.	*	43 EDUC. SERV	1845.	3010.
11 PRINTING	4592.	3968.	*	44 NONPROFIT	4718.	5670.
12 CHEMICALS	4185.	4388.	*	45 MISC. SERV	2830.	3623.
13 MACHINERY	7582.	9002.	*	46 SERVICES	44162.	62612.
14 ELECT MACH	2150.	3167.	*	47 CONST. AUX	91.	169.
15 TRAN EQUIP	9330.	10991.	*	48 MANUF. AUX	5311.	4797.
16 PAPER PROD	3664.	3035.	*	49 TRANS. AUX	310.	572.
17 PETROLEUM	163.	193.	*	50 FINAN. AUX	0.	0.
18 PLAST-GLAS	5158.	6522.	*	51 SERVIC AUX	311.	986.
19 PRIM METAL	4618.	5037.	*	52 TOTAL EMPL	249398.	300938.
20 FAP. METAL	9147.	9913.	*	53 AGRICULT.	795.	900.
21 INSTRUMENT	709.	817.	*	54 FORESTRY	0.	0.
22 MISC. MANU	126.	294.	*	55 MINING SUB	1172.	894.
23 ALL TRANSP	21213.	28219.	*	56 OTHER CONS	2981.	2371.
24 PASS. TRAN	1826.	2224.	*	57 MUSEUMS	0.	0.
25 SHIP. AIR	1129.	4415.	*	58 RETAIL SUP	48571.	59429.
26 TRANS SERV	424.	689.	*	59 MINING AUX	N/A	N/A
27 OTHER TRAN	8922.	9130.	*	60 WHOLF. AUX	657.	1161.
28 COMMUN.	5597.	7708.	*	61 RETAIL AUX	2710.	5602.
29 WHOLESALE	21764.	24562.	*	62 UNCLASS.	887.	1099.
30 RETAIL	51291.	65031.	*	63 UTILITIES	2802.	3451.
31 BANKING	5090.	7635.	*	64 FED. GOV.	22469.	22900.
32 SECURITIES	359.	369.	*	65 STAT-LOCAL	36083.	83700.
33 INSURANCE	989.	1320.	*	66 ALL GOVT.	59552.	107000.

Source: U.S. Department of Commerce, Bureau of
Economic Analysis and McDonald & Grefe, Inc.

Table B-2

EMPLOYMENT BY INDUSTRY GROUP
CONTRA COSTA COUNTY
1965 - 1973

SECTOR DESCRIPTION	1965 EMPLOYMENT	1973 EMPLOYMENT	*	SECTOR DESCRIPTION	1965 EMPLOYMENT	1973 EMPLOYMENT
1 AGRIC. SER	344.	633.	*	34 REAL ESTAT	863.	2622.
2 MINING	242.	353.	*	35 HOLDING CO	0.	0.
3 ALL CONSTR	9395.	7742.	*	36 ALL FINANC	3218.	6626.
4 BLD. CONST	3139.	2075.	*	37 HOTELS	511.	545.
5 TRADE CONT	4116.	3886.	*	38 BUS. SERV.	1339.	2930.
6 ALL MANUF.	26439.	25358.	*	39 PERPS. SERV	2519.	3079.
7 FOOD PROC.	2504.	1916.	*	40 ENTERTAINM	1093.	1149.
8 TEXTILES	0.	0.	*	41 HEALTH SER	2919.	7809.
9 APPAREL	0.	0.	*	42 LEGAL SERV	220.	395.
10 WOOD PROD.	294.	395.	*	43 EDUC. SERV	358.	1236.
11 PRINTING	761.	1404.	*	44 NONPROFIT	964.	1896.
12 CHEMICALS	3467.	2389.	*	45 MISC. SERV	519.	1273.
13 MACHINERY	576.	1196.	*	46 SERVICES	10442.	20223.
14 ELECT MACH	1131.	1873.	*	47 CONST. AUX	0.	0.
15 TRAN EQUIP	473.	681.	*	48 MANUF. AUX	1434.	1552.
16 PAPER PROD	2563.	1935.	*	49 TRANS. AUX	N/A	N/A
17 PETROLEUM	5504.	4152.	*	50 FINAN. AUX	0.	0.
18 PLAST-GLAS	1749.	1294.	*	51 SERVIC AUX	0.	0.
19 PRIM METAL	3581.	2522.	*	52 TOTAL EMPL	77038.	102303.
20 FAB. METAL	1636.	2369.	*	53 AGRICULT.	N/A	N/A
21 INSTRUMENT	1009.	859.	*	54 FORESTRY	0.	0.
22 MISC. MANU	82.	287.	*	55 MINING SUB	N/A	N/A
23 ALL TRANSP	5092.	8054.	*	56 OTHER CONS	2140.	2058.
24 PASS. TRAN	474.	819.	*	57 MUSEUMS	0.	0.
25 SHIP, AIR	311.	219.	*	58 RETAIL SUB	N/A	N/A
26 TRANS SERV	39.	97.	*	59 MINING AUX	0.	0.
27 OTHER TRAN	1411.	1778.	*	60 WHOLE. AUX	312.	484.
28 COMMUN.	1267.	2533.	*	61 RETAIL AUX	N/A	N/A
29 WHOLESALE	3294.	4179.	*	62 UNCLASS.	269.	567.
30 RETAIL	18303.	28543.	*	63 UTILITIES	1631.	2392.
31 BANKING	1597.	2308.	*	64 FED. GOV.	2360.	4600.
32 SECURITIES	88.	191.	*	65 STAT-LOCAL	16758.	27700.
33 INSURANCE	758.	1370.	*	66 ALL GOVT.	19118.	33000.

Source: U.S. Department of Commerce, Bureau of
Economic Analysis and McDonald & Grefe, Inc.

Table B-3

EMPLOYMENT BY INDUSTRY GROUP
SAN FRANCISCO COUNTY
1965 - 1973

SECTOR DESCRIPTION	1965 EMPLOYMENT	1973 EMPLOYMENT	*	SECTOR DESCRIPTION	1965 EMPLOYMENT	1973 EMPLOYMENT
1 AGRIC. SER	543.	409.	*	34 REAL ESTAT	6448.	8357.
2 MINING	631.	224.	*	35 HOLDING CO	1039.	1704.
3 ALL CONSTR	21805.	19447.	*	36 ALL FINANC	53316.	57690.
4 BLD. CONST	5318.	3969.	*	37 HOTELS	9330.	11500.
5 TRADE CONT	11590.	7755.	*	38 BUS. SERV.	15084.	24491.
6 ALL MANUF.	58404.	54131.	*	39 PERS. SERV	10734.	9971.
7 FOOD PRCC.	10706.	7768.	*	40 ENTERTAINM	4553.	6164.
8 TEXTILES	181.	511.	*	41 HEALTH SER	12505.	18243.
9 APPAREL	6893.	9376.	*	42 LEGAL SERV	3056.	5032.
10 WOOD PROD.	1660.	1509.	*	43 EDUC. SERV	2846.	5839.
11 PRINTING	12121.	10173.	*	44 NONPROFIT	8877.	13812.
12 CHEMICALS	1536.	1279.	*	45 MISC. SERV	6946.	9129.
13 MACHINERY	2441.	2032.	*	46 SERVICES	74394.	105055.
14 ELECT MACH	1224.	2220.	*	47 CONST. AUX	192.	1016.
15 TRAN EQUIP	2028.	1390.	*	48 MANUF. AUX	10168.	9643.
16 PAPER PKCD	805.	651.	*	49 TRANS. AUX	N/A	N/A
17 PETROLEUM	0.	0.	*	50 FINAN. AUX	50.	460.
18 PLAST-GLAS	1743.	915.	*	51 SERVIC AUX	278.	622.
19 PRIM METAL	859.	740.	*	52 TOTAL FMPL	351635.	395539.
20 FAB. METAL	5334.	4464.	*	53 AGRICULT.	N/A	N/A
21 INSTRUMNT	153.	299.	*	54 FORESTRY	0.	0.
22 MISC. MANU	1231.	1280.	*	55 MINING SUP	154.	153.
23 ALL TRANSP	44154.	50608.	*	56 OTHER CONS	4705.	6707.
24 PASS. TRAN	6313.	5736.	*	57 MUSEUMS	185.	252.
25 SHIP. AIR	11000.	12008.	*	58 RETAIL SUB	52543.	53512.
26 TRNS SERV	2505.	3452.	*	59 MINING AUX	N/A	N/A
27 OTHER TRAN	5893.	6149.	*	60 WHOLE. AUX	3763.	3946.
28 COMMUN.	N/A	N/A	*	61 RETAIL AUX	2434.	3752.
29 WHOLESALE	42724.	40487.	*	62 UNCLASS.	686.	1223.
30 RETAIL	54678.	57264.	*	63 UTILITIES	N/A	N/A
31 BANKING	19375.	29319.	*	64 FED. GOV.	33863.	36049.
32 SECURITIES	3165.	5152.	*	65 STAT-LOCAL	26248.	64545.
33 INSURANCE	23196.	22698.	*	66 ALL GOVT.	60240.	100598.

Source: U.S. Department of Commerce, Bureau of
Economic Analysis and McDonald & Grefe, Inc.

Table B-4

EMPLOYMENT BY INDUSTRY GROUP
NINE BAY AREA COUNTIES
1965 - 1973

SECTOR DESCRIPTION	1965 EMPLOYMENT	1973 EMPLOYMENT	*	SECTOR DESCRIPTION	1965 EMPLOYMENT	1973 EMPLOYMENT
1 AGRIC. SER	3246.	5210.	*	34 REAL ESTAT	17562.	26648.
2 MINING	N/A	N/A	*	35 HOLDING CO	1717.	2707.
3 ALL CONSTR	85297.	78608.	*	36 ALL FINANC	55946.	134264.
4 BLDG. CONST	26485.	24908.	*	37 HOTELS	16618.	21930.
5 TRAC. CONT	42022.	38826.	*	38 BUS. SERV.	39038.	65019.
6 ALL MANUF.	290907.	346732.	*	39 PERS. SERV.	35513.	38964.
7 FOLD PROD.	41151.	36884.	*	40 ENTERTAINM	14212.	18052.
8 TEXTILES	668.	779.	*	41 HEALTH SER	46425.	84659.
9 APPAREL	8556.	11621.	*	42 LEGAL SERV	7745.	9658.
10 WOOD PROD.	9572.	8375.	*	43 EDUC. SERV	14962.	26540.
11 PRINTING	24076.	24796.	*	44 NONPROFIT	19415.	30752.
12 CHEMICALS	13085.	14034.	*	45 MISC. SERV	17190.	22065.
13 MACHINERY	22922.	39014.	*	46 SERVICES	210290.	220032.
14 ELECT MACH	34553.	70334.	*	47 CONST. AUX	341.	1672.
15 TRAN. EQUIP	18927.	20573.	*	48 MANUF. AUX	N/A	N/A
16 PAPER PROD	10487.	9827.	*	49 TRANS. AUX	767.	1690.
17 PETROLEUM	5845.	4508.	*	50 FINAN. AUX	109.	655.
18 PLAST-GLAS	12312.	15059.	*	51 SERVIC AUX	819.	2023.
19 PRIM METAL	N/A	N/A	*	52 TOTAL EMPL	1100275.	1422163.
20 FAB. METAL	21944.	22459.	*	53 AGRICULT.	N/A	N/A
21 INSTRUMENT	3904.	6458.	*	54 FORESTRY	N/A	N/A
22 MISC. MANU	30824.	26440.	*	55 MINING SUP	N/A	N/A
23 ALL TRANSP	105081.	137825.	*	56 OTHER CONS	17473.	16432.
24 PASS. TRAN	10760.	10558.	*	57 MISCELLS	8.	286.
25 SHIP. AIR	26537.	37492.	*	58 RETAIL SUP	N/A	N/A
26 TRANS SERV	3228.	5784.	*	59 MINING AUX	861.	57.
27 OTHER TRAN	21519.	25178.	*	60 WHOLF. AUX	N/A	N/A
28 COMMUN.	N/A	N/A	*	61 RETAIL AUX	N/A	N/A
29 WHOLESALE	90356.	105952.	*	62 UNCLASS.	N/A	N/A
30 RETAIL	212663.	285922.	*	63 UTILITIES	N/A	N/A
31 BANKING	35340.	53711.	*	64 FED. GOV.	50500.	53200.
32 SECURITIES	4061.	6637.	*	65 STAT-LOCAL	208500.	256300.
33 INSURANCE	37204.	41504.	*	66 ALL GOVT.	259400.	389500.

Source: U.S. Department of Commerce, Bureau of
Economic Analysis and McDonald & Greffe, Inc.

Table B-5

EMPLOYMENT BY INDUSTRY GROUP
THREE-COUNTY BART AREA
1965 - 1973

SECTOR DESCRIPTION	1965 EMPLOYMENT	1973 EMPLOYMENT	*	SECTOR DESCRIPTION	1965 EMPLOYMENT	1973 EMPLOYMENT
1 AGRIC. SER	1387.	2108.	*	34 REAL ESTAT	10991.	17098.
2 MINING	1785.	1140.	*	35 HOLDING CO	1470.	2171.
3 ALL CONSTR	50131.	43487.	*	36 ALL FINANC	71692.	96770.
4 HLD. CONST	14430.	10934.	*	37 HOTELS	12153.	15066.
5 TRADE CONT	25592.	20509.	*	38 BUS. SERV.	23712.	39164.
6 ALL MANUF.	159433.	159762.	*	39 PERS. SERV	21748.	21603.
7 FOOD PROD.	26341.	20935.	*	40 ENTERTAINM	9010.	11152.
8 TEXTILES	571.	675.	*	41 HEALTH SER	27450.	47110.
9 APPAREL	7789.	10795.	*	42 LEGAL SERV	4200.	6974.
10 WOOD PROD.	5392.	5024.	*	43 EDUC. SERV	5049.	10055.
11 PRINTING	17474.	15545.	*	44 NONPROFIT	14555.	21378.
12 CHEMICALS	9188.	8556.	*	45 MISC. SERV	10795.	14025.
13 MACHINERY	10596.	12230.	*	46 SERVICES	128958.	187655.
14 ELECT MACH	4505.	7255.	*	47 CONST. AUX	283.	1185.
15 TRAN EQUIP	11831.	13052.	*	48 MANUF. AUX	16913.	15992.
16 PAPER PROD	7037.	5621.	*	49 TRANS. AUX	N/A	N/A
17 PETROLEUM	5647.	4345.	*	50 FINAN. AUX	50.	400.
18 PLAST-GLAS	8450.	8731.	*	51 SERVIC AUX	569.	1608.
19 PRIM METAL	9058.	8299.	*	52 TOTAL EMPL	678071.	795775.
20 FAB. METAL	10117.	16746.	*	53 AGRICULT.	N/A	N/A
21 INSTRUMENT	1871.	2025.	*	54 FORESTRY	0.	0.
22 MISC. MANU	1439.	1861.	*	55 MINING SUB	N/A	N/A
23 ALL TRANSP	70459.	85881.	*	56 OTHER CONS	9826.	11136.
24 PASS. TRAN	8623.	8779.	*	57 MUSEUMS	185.	252.
25 SHIP, AIR	12440.	16642.	*	58 RETAIL SUB	N/A	N/A
26 TRANS SERV	2968.	4238.	*	59 MINING AUX	N/A	N/A
27 OTHER TRAN	16226.	17057.	*	60 WHOLE. ALX	4732.	5591.
28 COMMUN.	N/A	N/A	*	61 RETAIL AUX	N/A	N/A
29 WHOLESALE	67782.	69228.	*	62 UNCLASS.	1842.	2909.
30 RETAIL	124567.	150828.	*	63 UTILITIES	N/A	N/A
31 BANKING	2662.	39242.	*	64 FED. GOV.	58692.	63549.
32 SECURITIES	3622.	5712.	*	65 STAT-LOCAL	79089.	175949.
33 INSURANCE	24943.	25388.	*	66 ALL GOVT.	137910.	240556.

Source: U.S. Department of Commerce, Bureau of
Economic Analysis and McDonald & Greffe, Inc.

Table B-6

EMPLOYMENT BY INDUSTRY GROUP
SAN FRANCISCO-OAKLAND SMSA
1965 - 1973

SECTOR DESCRIPTION	1965 EMPLOYMENT	1973 EMPLOYMENT	*	SECTOR DESCRIPTION	1965 EMPLOYMENT	1973 EMPLOYMENT
1 AGRIC. SER	2307.	3470.	*	34 REAL ESTAT	14006.	22068.
2 MINING	N/A	N/A	*	35 HOLDING CO	1546.	2529.
3 ALL CONSTR	64275.	56784.	*	36 ALL FINANC	79876.	110255.
4 BLDG. CONST	19242.	18097.	*	37 HOTELS	13741.	17657.
5 TRAFF. CONT	31239.	26152.	*	38 BUS. SERV.	29657.	48034.
6 ALL MANUF.	192396.	192256.	*	39 PERS. SERV	27090.	27894.
7 FOOD PROC.	29106.	23776.	*	40 ENTERTAINM	11018.	14342.
8 TEXTILES	668.	779.	*	41 HEALTH SER	32799.	50542.
9 APPAREL	8094.	11218.	*	42 LEGAL SERV	6757.	7789.
10 WOOD PROD.	6500.	5887.	*	43 EDUC. SERV	6757.	15141.
11 PRINTING	15491.	19227.	*	44 NONPROFIT	16181.	24427.
12 CHEMICALS	11630.	12069.	*	45 MISC. SERV	11596.	18919.
13 MACHINERY	12530.	14938.	*	46 SERVICES	154354.	229900.
14 ELECT MACH	15452.	17069.	*	47 CONST. AUX	341.	1872.
15 TRAN EQUIP	13546.	13801.	*	48 MANUF. AUX	9191.	21090.
16 PAPER PROD	9269.	7467.	*	49 TRANS. AUX	767.	1690.
17 PETROLEUM	5726.	4435.	*	50 FINAN. AUX	109.	699.
18 PLAST-GLAS	9792.	10119.	*	51 SERVIC AUX	742.	1563.
19 PRIM METAL	11852.	12069.	*	52 TOTAL EMPL	921137.	995907.
20 FAB. METAL	19449.	18681.	*	53 AGRICULT.	2218.	3397.
21 INSTRUMENT	2499.	2840.	*	54 FORESTRY	N/A	N/A
22 MISC. MANU	3214.	4265.	*	55 MINING SUB	1124.	978.
23 ALL TRANSP	89489.	114769.	*	56 OTHER CONS	14043.	14217.
24 PASS. TRAN	9357.	9407.	*	57 MUSEUMS	8.	266.
25 SHIP, AIR	25279.	35804.	*	58 RETAIL SUP	N/A	N/A
26 TRANS SERV	3070.	5128.	*	59 MINING AUX	881.	57.
27 OTHER TRAN	17274.	18927.	*	60 WHELE. AUX	N/A	N/A
28 COMMUN.	21706.	28968.	*	61 RETAIL AUX	N/A	N/A
29 WHOLESALE	78678.	86712.	*	62 UNCLASS.	N/A	N/A
30 RETAIL	155427.	190967.	*	63 UTILITIES	11889.	15172.
31 BANKING	28758.	43949.	*	64 FED. GOV.	68300.	70700.
32 SECURITIES	3696.	5895.	*	65 STAT-LOCAL	152500.	206200.
33 INSURANCE	31761.	35052.	*	66 ALL GOVT.	221200.	276500.

Source: U.S. Department of Commerce, Bureau of
Economic Analysis and McDonald & Greffe, Inc.

Table B-7

EMPLOYMENT BY INDUSTRY GROUP
WEST COAST SMSAs
1965 - 1973

SECTJR	1965	1973	*	SECTCP	1965	1973
DESCRIPTION	EMPLOYMENT	EMPLOYMENT	*	DESCRIPTION	EMPLOYMENT	EMPLOYMENT
1 AGRIC. SER	13081.	19915.	*	34 REAL ESTAT	52555.	64256.
2 MINING	12268.	11298.	*	35 HOLDING CO	4868.	8710.
3 AIL CONSTR	260027.	262163.	*	36 ALL FINANC	302070.	414614.
4 BLD. CONST	72572.	75524.	*	37 HOTELS	52107.	71510.
5 TRADE CONT	138616.	140784.	*	38 BUS. SERV.	136357.	220217.
6 ALL MANUF.	1278906.	1453436.	*	39 PERS. SERV	123456.	130527.
7 FOOD PROD.	114083.	106555.	*	40 ENTERTAINM	68975.	95552.
8 TEXTILES	9096.	11867.	*	41 HEALTH SER	172951.	303171.
9 APPAREL	69205.	88048.	*	42 LEGAL SERV	19256.	31007.
10 WOOD PROD.	118867.	149590.	*	43 EDUC. SERV	44921.	74576.
11 PRINTING	73631.	84199.	*	44 NONPROFIT	59512.	90972.
12 CHEMICALS	38635.	46803.	*	45 MISC. SERV	62209.	89525.
13 MACHINERY	30778.	51438.	*	46 SERVICES	763509.	1150077.
14 ELECT MACH	123586.	175960.	*	47 CONST. AUX	2244.	2383.
15 TRAN EQUIP	229110.	222635.	*	48 MANUF. AUX	31490.	52676.
16 PAPER PROD	29050.	30538.	*	49 TRANS. AUX	1155.	3290.
17 PETROLEUM	14427.	12764.	*	50 FINAN. AUX	777.	1751.
18 PLAST-GLAS	60380.	72931.	*	51 SERVIC AUX	2641.	5522.
19 PRIM METAL	37289.	42199.	*	52 TOTAL EMPL	4048055.	5155739.
20 FAB. METAL	98871.	108173.	*	53 AGRICULT.	8926.	15095.
21 INSTRUMENT	24143.	32919.	*	54 FORESTRY	1587.	1981.
22 MISC. MANU	30555.	26049.	*	55 MINING SUB	2249.	2343.
23 ALL TRANSP	313090.	398470.	*	56 OTHER CONS	34102.	32936.
24 PASS. TRAN	25480.	28100.	*	57 MUSEUMS	734.	1760.
25 SHIP, AIR	32646.	80245.	*	58 RETAIL SUB	452474.	590471.
26 TRANS SERV	9330.	16515.	*	59 MINING AUX	2165.	2037.
27 OTHER TRAN	72042.	85542.	*	60 WHOLE. AUX	9291.	13184.
28 COMMUN.	84662.	99510.	*	61 RETAIL AUX	13535.	26759.
29 WHOLESALE	326579.	402283.	*	62 UNCLASS.	10403.	16664.
30 RETAIL	762276.	1017834.	*	63 UTILITIES	32717.	38938.
31 BANKING	110362.	151053.	*	64 FED. GOV.	195200.	223300.
32 SECURITIES	10966.	16638.	*	65 STAT-LOCAL	600400.	859500.
33 INSURANCE	109195.	129817.	*	66 ALL GOVT.	865400.	1184600.

Source: U.S. Department of Commerce, Bureau of
Economic Analysis and McDonald & Greffe, Inc.

Table B-8

EMPLOYMENT BY INDUSTRY GROUP
HEADQUARTERS SMSAs
1965 - 1973

SECTOR DESCRIPTION	1965 EMPLOYMENT	1973 EMPLOYMENT	*	SECTOR DESCRIPTION	1965 EMPLOYMENT	1973 EMPLOYMENT
1 AGRIC. SER	30552.	43288.	*	24 REAL ESTAT	126486.	176778.
2 MINING	38886.	47129.	*	35 HOLDING CO	17354.	27580.
3 ALL CONST	941829.	987192.	*	36 ALL FINANC	1389959.	1635644.
4 BLD. CONST	146831.	177314.	*	37 HOTELS	175682.	208603.
5 TRADE CONT	520100.	517287.	*	38 BUS. SERV.	534892.	788605.
6 ALL MANUF.	6334376.	5971696.	*	39 PERS. SERV	525224.	452577.
7 FOOD PROC.	493081.	395396.	*	40 ENTERTAINM	218207.	259284.
8 TEXTILES	31929.	33712.	*	41 HEALTH SER	749307.	1116830.
9 APPAREL	231638.	230927.	*	42 LEGAL SERV	52239.	84555.
10 WOOD PROD.	178316.	191808.	*	43 EDUC. SERV	292357.	353411.
11 PRINTING	454472.	438947.	*	44 NONPROFIT	308191.	407710.
12 CHEMICALS	159499.	179808.	*	45 MISC. SERV	211574.	262471.
13 MACHINERY	369738.	405591.	*	46 SERVICES	3183201.	4153583.
14 ELECT MACH	592690.	576113.	*	47 CONST. AUX	8727.	9704.
15 TEAM EQUIP	614405.	561071.	*	48 MANUF. AUX	344522.	426695.
16 PAPER PROD	85808.	90472.	*	49 TRANS. AUX	6019.	11993.
17 PETROLEUM	44718.	43651.	*	50 FINAN. AUX	1626.	2762.
18 PLAST-GLAS	226383.	243126.	*	51 SERVIC AUX	18091.	23951.
19 PRIM METAL	356582.	302288.	*	52 TOTAL EMPL	18215122.	20356814.
20 FAB. METAL	372957.	437890.	*	53 AGRICULT.	15184.	26472.
21 INSTRUMENT	112374.	110132.	*	54 FORESTRY	3002.	1893.
22 MISC. MANU	79347.	62220.	*	55 MINING SUB	2783.	2724.
23 ALL TRANSP	1403953.	1457080.	*	56 OTHER CONS	106644.	123786.
24 PASS. TRAN	178011.	217833.	*	57 MUSEUMS	86101.	8662.
25 SHIP, AIR	221586.	259663.	*	58 RETAIL SUB	970662.	1310714.
26 TRANS SERV	49741.	60497.	*	59 MINING AUX	12146.	14616.
27 OTHER TRAN	200381.	194034.	*	60 WHOLE. AUX	61194.	84864.
28 COMMUN.	213618.	269582.	*	61 RETAIL AUX	52036.	90732.
29 WHOLESALE	1391936.	1505419.	*	62 UNCLASS.	29729.	45188.
30 RETAIL	3146985.	3658330.	*	63 UTILITIES	90950.	113094.
31 BANKING	300346.	415886.	*	64 FED. GOV.	575000.	638800.
32 SECURITIES	89576.	133589.	*	65 STAT-LOCAL	1268500.	2420000.
33 INSURANCE	350441.	402223.	*	66 ALL GOVT.	2510700.	3386700.

Source: U.S. Department of Commerce, Bureau of
Economic Analysis and McDonald & Greffe, Inc.

APPENDIX C

INTERVIEW LIST
KEY INFORMANTS AND DIRECTED INTERVIEWS

APPENDIX C
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Appendix C

INTERVIEW LIST KEY INFORMANTS AND DIRECTED INTERVIEWS

A. Key Informants

- Mr. Stanley Allen, Executive Vice-President, Fremont Chamber of Commerce
- Mr. James Arujo, Executive Vice-President, Hayward Chamber of Commerce
- Mr. Burton Bangsberg, Assistant Director, Oakland Office of Community Development, Oakland City Center
- Mr. Clarence Betz, Manager, Orinda Chamber of Commerce
- Mr. Carl Bruene, Area Services Manager, Pacific Gas and Electric Company
- Mr. Lance Burris, Director, Richmond Redevelopment Agency
- Mr. John Bush, Senior Planner, Hayward Planning Department
- Mr. David Collins, Assistant Director, Yerba Buena Center Redevelopment
- Mr. D. T. Daggett, Vice-President and General Manager, Southern Pacific Railroad Industrial Development Company
- Mr. William Dauer, Executive Vice-President, San Francisco Chamber of Commerce
- Mr. J. deLeau, Executive Vice-President, Walnut Creek Chamber of Commerce
- Mr. Harold Ellis, President, Grubb & Ellis Real Estate
- Mr. Anthony Fisher, Manager of Commercial Development, Crocker Land Company
- Mr. John Horton, Executive Vice-President, Richmond Chamber of Commerce
- Mr. Paul Huey, Executive Vice-President, Contra Costa County Development Association
- Mrs. Ann Lore, Manager, Orinda Chamber of Commerce

Mr. Gregory Oliver, Economist, San Francisco Mayor's Office
of Economic Development

Mr. Edward Phillips, Director, Concord Planning Department

Mr. Irving Reichert, General Counsel, San Francisco Bar Association

Mr. Barry Reubens, Manager of Technical Analysis and Site
Selection, Great Western Savings

Mr. William Rugg, Director, San Leandro Redevelopment Agency

Mr. Angelo Siracusa, Executive Vice-President, Bay Area Council

Mr. Harry Stoopes, Executive Vice-President, Berkeley Chamber
of Commerce

Mr. Robert Sullivan, President, San Francisco Convention and
Visitors Bureau

Mr. Michael Wyant, Director of Branch Locations, Home Savings
and Loan Association

Mr. Leonard Yaseen, Executive Vice-President and General
Manager, the Fantus Corporation, Park Avenue, New York,
New York

B. Directed Interviews

Mr. Alan Able, Director of Enrollment, Kaiser Foundation Health
Plan, Inc.

Mr. Robert Bagley, General Manager, The Towne Hotel, Market
Street, San Francisco

Mr. Thayer Barcelon, Manager, Terminal Shopping Center, Concord,
California

Mr. Craig Barton, WS&Y Consultants, San Francisco, California

Mr. Hollis Basconb, Owner/Plant Manager, Arcon Pacific Corpora-
tion, Oakland, California

Mr. William Berk, Manager, Personnel, The Clorox Company,
Oakland, California

Mr. Richard Betts, President, Urban Property Analysis, Berkeley,
California

Mr. Frederick Bold, Jr., Attorney, Bold & Polisner, Walnut
Creek, California

Mr. Charles Bono, Briggs, Andrew & Pope, Property Managers,
Berkeley, California

Mr. Kenneth Brooks, Plant Manager, General Motors Co., Fremont,
California

Mr. Andrew Brown, President, Relocation Consultants, San
Francisco, California

Mr. George Bruns, President, Systron & Donner, Concord,
California

Mr. Charles Coleman, Personnel Manager, Social Security Ad-
ministration, Western Division

Mr. Thomas Corcoran, Consultant Administrator, Walnut Creek,
California

Mr. E. G. Craig, Architect, Developer, Lafayette, California

Mr. John Custer, Vice-President, Health Plan, Kaiser Permanente
Services, Inc.

Mr. Thomas DeAngello, General Manager, Sheraton Palace Hotel,
Market Street, San Francisco, California

Mr. John Dykstra, Consultant, Pacific Rim Associates, San
Francisco, California

Mr. Frank Earhardt, Oakland Transportation Department Senior
Planner, Oakland, California

Mr. David Elliot, Vice-President, Heiderick & Struggles, Inc.,
San Francisco, California

Mr. Dennis Flack, Employee Relations, Diablo Systems, Incor-
porated, Hayward, California

Mr. Harold Fritz, Manager, Penney's Department Store, Berkeley,
California

Mr. Frank Giardino, Vice-President/Internal Manager, Boyden
Associates, San Francisco, California

Mr. Thomas Gilette, District Manager, Western Pacific Railroad,
San Francisco, California

Mrs. Ruth Church Gupta, President, Lawyers Club of San
Francisco, San Francisco, California

Mr. Howard Hagan, Kaiser Properties Incorporated, Oakland,
California

Mr. Howard Haggerty, Vice-President, Properties, Kaiser Foundation Health Plan, Inc.

Mr. Howard Henderson, Store Manager, Emporium, Capwell's, San Francisco, California

Mr. John Hill, Branch Manager, Great Western Savings, Berkeley, California

Mr. George Housman, Manager Commute Services, Southern Pacific Railroad, San Francisco, California

Mr. Lyman Jee, President, Arcon Pacific Corporation, San Francisco, California

Mr. Donald Jones, Special Agent, Federal Bureau of Investigation, Berkeley, California

Dr. Michael Katcher, Director, Statistical Analysis, Kaiser Permanente Medical Care Program

Mr. David Kelly, CPA, Walnut Creek, California

Mr. Joseph Landisman, Attorney, Landisman, Corburn, Martin & Wayne, Berkeley, California

Mr. Robert Martin, Plant Manager, American Cryogenics, Union City, California

Dr. Melvin Melby, Director, Berkeley Data Research Office, Berkeley, California

Mr. Edward Montes, Vice-President, Pan American Federal Savings and Loan Association, San Francisco, California

Mr. Robert Neil, Manager, Fremont Fashion Center, Fremont, California

Mr. Dale Odell, Project Director, Oakland City Center Project

Mr. Robert Piper, Director, Department of Transportation, Berkeley, California

Mr. Jean Powell, Leasing Agent, Systec Financial Corporation

Mr. Dwight Reeka, Owner/Manager, The Elegant Ranch Restaurant, Hayward, California

Mr. Thomas V. Roland, Attorney, Berkeley, California

Mr. Michael Rosenquist, Transportation Planner, City of Walnut Creek, California



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- Mr. John Samter, Transmission Planning, Pacific Gas and Electric Company
- Mr. Kenneth B. Satrom, Regional Vice-President, Greyhound Lines
- Mr. Douglas Saulter, Project Director, Grubb & Ellis Realty, Oakland City Center, Oakland, California
- Mr. Joseph Shakespeare, General Manager, Aetna Life & Casualty Insurance Co., San Francisco, California
- Mr. Jack Shroder, Joe Duffle & Associates, Lafayette, California
- Mr. Larry Smith, President, Elkay Investment Corporation, Walnut Creek, California
- Mr. Robert Sproul, President, San Francisco Bay Association, San Francisco, California
- Ms. Linda Squires and Dean Ralph Hillsman, City College, San Francisco, California
- Mr. Bud Stewart, City Manager, Concord, California
- Mr. Robert Symonds, Vice-President, California Savings and Loan Company, San Francisco, California
- Mr. Richard Thomas, Principal Consultant, On-Line Decisions, Berkeley, California
- Mr. Robert Thorne, Regional Director, Energy Research and Development Administration, San Francisco, California
- Mr. W. M. Touvers, Executive Vice-President, Corporate Affairs, The Clorox Company, Oakland, California
- Mr. Anthony Vergari, Assistant Regional Director, Energy Research and Development Administration, San Francisco, California
- Mr. Arvol Wade, Manager of Employee Relations, Standard Oil Credit Office, Concord, California
- Mr. William Weir, Manager of Office Operations, The Clorox Company, Oakland, California
- Mr. Robert Williams, Principal, Economics Science Corporation, Berkeley, California
- Mr. Robert Wilmoth, Vice-President, Branch Locations, Crocker National Bank, San Francisco, California
- Mr. Gilbert Zaballos, Zaballos & Sons, General Contractors, Hayward, California

